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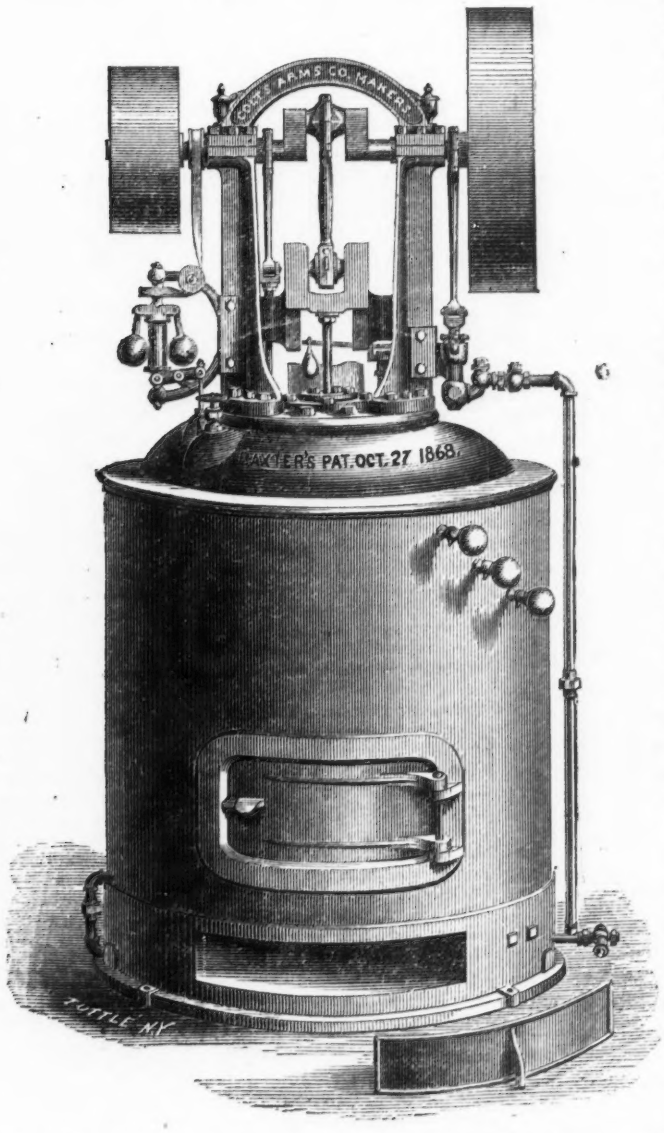
The Baxter Portable Engine.

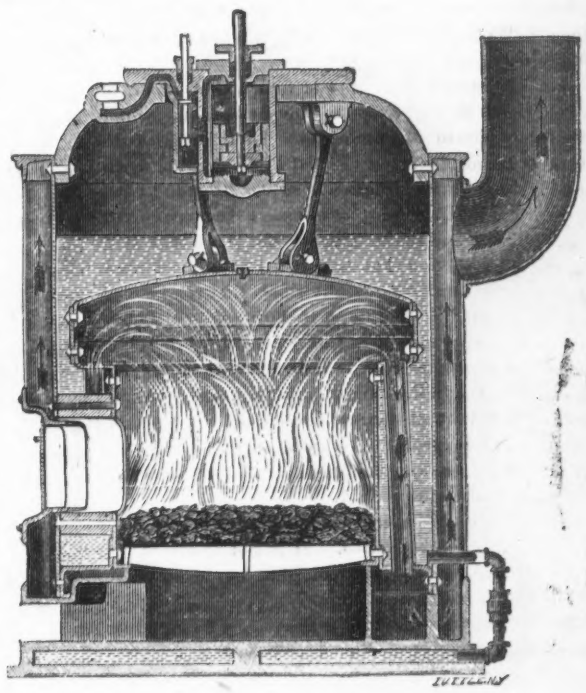
We herewith illustrate one of the neatest little steam engines on exibition at the Fair of the American Institute, now being held at the Rink at Sixty-third street and third avenue. Several of these engines of different powers are on exhibition, and they attract almost universal commendation from the experts in machinery, who frequent the department of the fair devoted to mechanical contrivances.

A glance at our large engraving, which represents the engine as seen when running, will show at once that its prominent and distinctive feature, is that the cylinder is surrounded by the boiler, so that the steam passed from one to the other without the slightest loss by radiation. The same arrangement also secured the most thorough jacketing of the cylinder, and prevents any loss of heat from it.

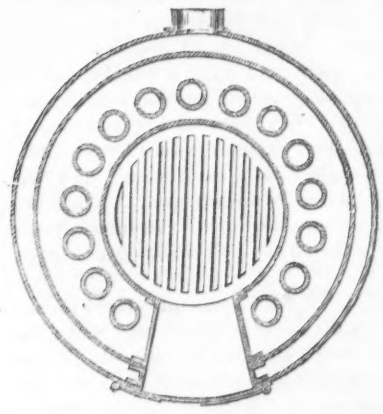


The engine has a broad firm base, and wears a look of substantiality, which at once attracts the attention of the connoisseur. Owing to the comparatively large diameter, and the placing of the cylinder below the top of the boiler, the centre of gravity of the whole machine is brought down low, and any shaking of the top frame, on which the driving wheel is hung, is entirely prevented, and the desired compactness and solidity, which is usually acquired by the use of a heavy and otherwise useless bed-plate, is gained, without the necessity of buying and transporting an unwieldy and expensive casting.

Our first figure shows also the position of the governor, and the way in which it is operated. As it was first introduced to the public, the Baxter engine was fitted with a complex cut-off arrangement, which has now been replaced by a much more simple arrangement. The same figure shows the position of the safety-valve, the excentrics which work the valve and the feed pump, the feed-pump itself, the gauge cocks, crank, crank-shaft driving wheels, etc.



Our second figure is a sectional view, showing the exact position of the cylinder, piston, steam-chest valves and valve rod. It shows also how the interior of the boiler is braced, so as to give it the requisite strength; the position of the grate and combustion chamber, the direction and number of times that the heated products of combustion are obliged to traverse the boiler before escaping, the pipe by which the heated water from the water-bottom is forced into the boiler, and in fact everything that it is essential to know about the interior arrangement, except the position of the flues which is shown in figure 3.



The water-bottom, it will be seen on a minute's consideration, answers a double purpose. It prevents the heat becoming sufficiently intense to injure or set fire to the floor, and by heating the feed water, adds to the economy of the engine.

In conclusion let us say one word about the portability of this engine. It is evident that it could be easily placed upon wheels and carried about for agricultural or other purposes, and we understand that the Colt Firearms Company of Hartford, the manufacturers of these engines, are now fitting some engines in this way, but, at the same time, the Baxter possesses evident advantages for use as a stationary engine for moderate powers. No commendation of the work of the Colt Fire-arms Company is necessary and further particulars may be had from the Baxter Steam Engine Company, whose card may be found in our advertising columns.

The Covering of Boilers and Steam-pipes.

We learn that in the Chicago Water Works there were four boilers, two of which were protected by the non-conducting covering made under the Chalmers-Spence patent, while the other two were covered with hair feltings. After the fire, the two that were covered with the hair felting were so badly burned that they will have to be replaced by new ones; the two covered with the non-conductor were quite good, and are now in use, though the heat in the boiler-room

was so great that the brass guage cocks were melted. The Chicago Water Works have, since the fire, ordered that their steam-pipes and cylinders be covered with the non-conductor, which work is now being done. This covering also saved the steam-pipes and cylinders at Sand's brewery, and the National Elevator, to a great extent. Thus we see that besides considerably diminishing the radiation of heat, and the consequent cost of running an engine, the non-conducting properties of the Chalmers-Spence covering render it especially valuable as a protection against fire.

Polytechnic Association of the American Institute.

Meeting held at their Rooms, Oct. 19, 1871. The President (Prof. S. D. Tillman) in the chair.

Dr. Lewis Feuchtwanger read a paper on chromium, an abstract of which will be found elsewhere, and which led to the following remarks by other members :

Dr. P. T. Van der Weyde—A more interesting subject than chromium could not have been selected; for there is no more wonderful substance in the whole field of chemistry. It has been found that chromium steel is one of the stoutest kinds of steel existing. The Superintendent of the great bridge, building at St. Louis, has made experiments upon the strength of different kinds of steel; and he found that heavy bars of steel did not come up to the standard. For instance, taking a bar of steel of one square inch section, which would bear a tensile strain of 100,000 lbs., it was found that a bar of steel, of six or eight square inches section, would not bear a strain in proportion. Their bridge is to be of the same character as that of Louisville, upon the same system of girders which have to stand both pressure and expansion. It is found that chromium steel will not only bear 140,000 lbs. for a bar of a square inch section, but that a bar of eight square inches section will bear eight times that strain. It has been decided, therefore, to build the St. Louis bridge of chrominm steel. I have become acquainted recently with parties making silicic steel. It was to be expected that silica might take the place of carbon in steel, but that chromium could take the place of carbon was unexpected. Sulphur or phosphorus in iron injures it, making it cold-short; but chromium, carbon and silica improve it.

The oxide of chromium is the substance with which our greenbacks are printed. It is not so bright as green produced with prussian blue, but cannot be changed chemically.

Dr. Feuchtwanger—That is the reason I made ink of it. It makes a good black ink, with a greenish tinge.

Dr. Van der Weyde—The bichromate of gelatine has the peculiar property of being soluble in the dark, but when exposed to the light it becomes insoluble. Coating a plate with it, and putting it under a negative, wherever the sun strikes it, it makes it insoluble, the solubility being in proportion to the amount of light. After it has been exposed two or three minutes, it is carefully washed with warm water, and that which is still soluble is washed away, leaving the picture in relief upon the plate. In this way the Albertype is made, and any number of copies can be printed.

The bichromate of potash was introduced for use in batteries, by the Chesters, in this city, under the name of the ——— Fluid. When it is used in a battery, there are no fumes at all, because the product is chrome alum, an alum in which chrome-oxide replaces alumina.

Chrome yellow is often adulterated with chalk. The test of its purity is to determine how much blue may be mixed with it, and form a green. If there is much white in it, it will not make a good green. It will take a good deal of white without showing it, in the yellow color; but, mixing blue with it detects it at once.

Mr. Bull—The chromate of potash acts like prussiate in hardening. The prussiate of potash leaves a scale upon the metal; the chromate leaves it cleaner; but the cyanide leaves it very clean.

Dr. Van der Weyde—When you use the cyanide you make a carbon steel; but when you use the chromate of potash you make a chrome steel.

Mr. J. K. Fisher.—The safe-makers are using chrome steel. Marvin introduced chrome steel for that purpose. The strength of the chrome steel has been estimated at 140,000 lbs. It will be recollected that last season we had here a sample of the Sherman steel, stated to sustain 263,000 lbs. to the square inch of section. The Bessemer steel comes up to about 130,000 lbs., but it is not uniform. I would like to know whether the chrome steel is uniform, and whether it is an expensive steel.

Dr. Feuchtwanger.—It is not more expensive than any other steel.

Prof. James A. Whitney.—According to Osborn's recent work, chromium steel is inferior for tool making to the best made crucible steel of ordinary manufacture. But these kinds of steel are of little consequence compared with low steel. The quantity of high steel used in this country is small compared to the low steels that either now find, or must hereafter find, application for rails, axles, steam boilers, etc., as a substitute for wrought iron. I may mention, incidentally, that two or three years ago I saw steel cylinders, of steel about one-sixteenth of an inch in thickness, which had been tested with a pressure of 600 lbs. to the square inch; and they were bulged out in the centre into a barrel shape, while cast steel cylinders of the same size and thickness showed no change from the severe test.

Dr. Feuchtwanger.—The chrome steel is not so good as the tungsten steel; but it can be made cheaply. Chromic ore can be bought for $4 a ton.

Dr. L. Bradley suggested the use of chromic acid instead of bichromate of potash for batteries, as probably cheaper; but, learning that the former costs forty cents and the latter seventy-five cents, concluded that there was no material difference in cost, taking into consideration the work done by each.

Dr. Van der Weyde stated that he had ascertained by experiments that bichromate of potash and sulphuric acid would bleach linseed oil and deodorise it splendidly; but unfortunately, the moment the painter mixed it with white lead, it turned yellow, forming the chromate of lead. (Laughter.)

new coffee pot.

Mr. O. M. Tinkham exhibited and explained a new coffee pot, consisting of three parts: 1. The ordinary coffee pot; 2. a small cup, placed above it, with a flannel filter at the bottom in which the ground coffee is to be put; 3. a vessel with small holes in the bottom, to be placed above the cup, and filled with water. The water from the upper vessel descends slowly upon and percolates through the coffee, receiving its aroma, and is received in the lower vessel. He remarked that some philosopher had said that a man who buys his coffee in packages, and expects to find it pure, "don't know beans." (Laughter.) With this apparatus, the coffee may be ground as fine as meal, and yet will be clear. So far as the taste is concerned, he regarded coffee boiled as coffee spoiled.

Dr. Van der Weyde recommended making coffee by percolation with cold water, and warming it afterwards. If we take the coffee, after its aroma has been taken out by percolation, and attempt to form a drink from it, it will be unfit to drink.

Mr. Fisher stated that Liebig's plan was to take the grounds and make coffee from them, and to mix it with coffee made by percolation; thus combining the strength of the former with the flavor of the latter.

Dr. Van der Weyde stated that in Paris they have discovered that coffee beans can be made out of clay, and mixed with the genuine coffee, taking its perfume, and difficult to distinguish from the real coffee, especially after burning.

Prof. Whitney stated that when coffee beans are roasted, the peculiar essential principle, coffeine, is produced from the constituents of the berry. This is doubtless more readily soluble in cold water than the resinous matter and tannin. If we apply the leaching process, we simply extract the first; but if we apply heat we dissolve also the resinous, the coloring and astringent matter, and, of course, the coffee is muddy. I have found it impossible to get a good cup of coffee between San Francisco and Chicago, and if this principle could be applied to a small portable coffee pot, to be used with an alcohol lamp, it would be a blessing to travelers.

The President remarked that condensed milk is better than cream for coffee.

Mr. ——— considered it a great mistake to make coffee in a tin coffee-pot, and recommended the porcelain lined coffee pot.

Mr. Fisher added that it was a mistake to make the coffee pot with a nozzle, which could not be kept clean.

Dr. Van der Weyde said that as the heat spectrum is at one end of the light spectrum, extending beyond the red rays, it was natural to expect that on heating a substance its color would go towards the hot end of the spectrum, and that on its cooling its color would go back.

Mr. Fisher—Ever since English art began, red and the neighboring colors have been considered warm, while blue has been considered a cold color.

Dr. Van der Weyde—My impression is that in fact blue feels cool, and red feels warm.

Mr. R. Weir—In painting a winter scene, the artist uses different tints from those used on a summer scene. He indicates the warmth or the cold by the tints employed.

Scientific Notes.—The President read a number of items of scientific news, of which we give the following, as the most important. The crowded state of our columns precludes the possibility of giving them all.

A Steam Hygrometer.—This instrument, invented by Leicester Allen, is designed for the purpose of measuring the amount of moisture in steam generated in ordinary boilers; the terms "wet steam" and "dry steam" being used to distinguish steam holding particles of water from that which has been completely volatilized. The construction of this instrument is based upon the fact that the amounts of heat in a pound of water at 212° Fahrenheit and a pound of steam at the same temperature are well known. To determine the amount of heat carried out of a boiler an apparatus has been devised, which consists of a scale-beam with a platform and a thickly felted water-chamber at one end, and a counterpoise at the other, having a sliding weight indicating pounds and half-pounds. The walls of the water-chamber are made of thin tinned sheet copper, there being two shells, between which felting, 1½ inches thick, is placed. A felted cover is also provided, through which is inserted a standard thermometer having a large bulb, and easily read in fifths or degrees. A finely perforated coiled copper pipe rests upon the inner floor and passes out at the lower part of the side wall of the chamber. This is the steam induction pipe. The lower part of the chamber has the shape of an inverted tunnel, to which is attached an escape-pipe. Both pipes are provided with cocks. A small funnel in the cover, also provided with a cock, completes the apparatus. To use this instrument, five pounds of water are placed in the chamber and raised to 80° Fahrenheit, by allowing steam to pass through the coil. The surplus water is drawn off, leaving five pounds of water at 80°, containing 400 units of heat. The sliding weight is then placed at the 5½ pounds notch, and the steam to be tested is allowed to flow in until the scale-beam is balanced. The influx of steam is then stopped, and the thermometer is read. With these data the amount of water in the steam is calculated.

To Detect Sulphur in Coal Gas.—Ulex has published a simple process of detecting the presence of sulphur in ordinary illuminating gas. The flame from the gas is used in a Bunsen burner to heat a clean platina dish containing water. After evaporating about a pint of water, the outside of the vessel will be found to be partly coated with an oily fluid, which can be distinctly shown, by ordinary qualitative tests, to be sulphuric acid. The same author states that the white incrustation which sometimes makes its appearance on the inside of the lamp chimneys, consists of sulphate of ammonia.

Adjourned.

The Moneres and Spontaneous Generation.

From the "BIOLOGISCHE STUDIEN" of Dr. ERNST HAECKEL.
By Dr. ADOLPH OTT.

AMONG the many problems of a more general significance, which by DARWIN's reform of the evolution hypothesis have been brought nearer to their solution, the problem of spontaneous generation is one of the most important, but also most difficult. True, DARWIN has not dwelt upon it, but has declared plainly, that his argument has nothing to do with the origin of life. Yet it is quite natural that every thoughtful reader of his books should raise the question, whence the first being originated, from whom, according to DARWIN, all other beings can be derived. The lively and general interest now felt in the hypothesis of spontaneous generation proves sufficiently its intimate connection with the hypothesis of evolution.

The theory of spontaneous generation is in fact a necessary and integral factor of the universal theory of evolution. It is the natural bridge which connects the hypothesis of KANT and LAPLACE of the physical origin of the world with the hypothesis of the natural origin of life of LAMARCK and DARWIN.

Recognizing in the whole history of inorganic nature, in the origin of the solar systems with their complicated planet-orbits, the earth's crust, with her seas, mountains, etc., in the whole history of organic nature, in the origin of all the various organisms, as derived from one simple primitive form, the operations of law, we are forced by logic, to adopt for that initial point in the history of development a natural, and not an involuntary, act of creation. This natural act, however differently it may be regarded in detail, resolves itself into spontaneous generation, viz., the origin of simple organisms from so-called lifeless inorganic matter.

Until quite recently, the doctrine of spontaneous generation has been treated by most naturalists in a very imprudent and crude manner. Instead of theoretically investigating the significance of the question in every direction, they plunged themselves into experiments and demanded answers from them, before proper questions had been put. It is well known in what manner this took place. Not having witnessed the origin of life in the chemical laboratory, they supposed themselves to have disproved the hypothesis, and arrived at the very superficial conclusion: "Spontaneous generation does not exist." And still, what could those celebrated experiments of PASTEUR and others prove, but that under those special and complicated conditions, no organisms had originated spontaneously?

In the detailed *critique* of spontaneous generation which I have given in the sixth chapter of my general Morphology (*Generelle Morphologie*) I have proven the worthlessness of all these vaunted experiments, and have shown that this question must be treated differently. It is true that the hypothesis of spontaneous generation can never positively be disproved; but it is equally true that it has, as yet, not been positively proven, since no one has ever witnessed the origin of an organism without provocation. But, thanks to the late progress in biology, the hypothesis of spontaneous generation possesses no longer the theoretical difficulties which formerly beset it.

No discovery is in this regard more important than that of the *moneres*. Before these most simple imaginable beings were known, the notion of spontaneous generation was answered by the fact that even the simplest organism could only be conceived of as a cell. Even the simplest "primitive cell," which generally was considered as the first step in the long line of organic beings, was already an "elementary organism," composed of two, chemically, physically and morphologically different parts—of an interior nucleus and an exterior protoplasma. The origin of such a plastid with a nucleus is hardly conceivable.

But this view has been changed since there has been discovered in the *moner* an organism, the exterior body of which consists of a nude plastid without nucleus; that is, of a most simple cystode or celline. The entire body, as recognizable by means of our finest optical and chemical tests, consists in these *moneres* of a perfectly homogeneous substance, of an albumen-compound without structure, this most simple organism being at the same time entirely formless.

The form which it shows in every moment is only the product of the exterior world; it has originated by adaptation to the conditions of the exterior world! With regard to the most simple *moneres*, as the *Protomœbes* and *Protogenes*, there exists even no individual development. It is only a growth, as in crystals; and when the growth has attained a certain degree by nutrition, the body separates into two parts.

The simple process of propagation may in fact be represented quite mechanically. The growth of the simple plasma particle is a purely physical process, like the growth of a crystal. The most striking difference between the two, viz., that the growth of an inorganic crystal takes place by accretion from outward and the growth of a moner by endogenous increment towards the interior, is explained by the solid aggregate condition of the former and the semi-fluid state of the latter. In consequence of this fact, and from the simplest mechanical causes, no propagation can take place among crystals. But among *moneres* it *must* take place, as soon as the limited power of cohesion of the plasma-molecules, which are imbibing the substances surrounding them, is no longer sufficient to keep together the whole body. The most important vital phenomena of the *moneres* can therefore be explained mechanically, that is, reduced to physico-chemical laws. All other phenomena could be explained only by subsequent adaptation.

[TO BE CONCLUDED.]

Chromium and its Compounds.

By Dr. LEWIS FEUCHTWANGER.

THE following is an abstract of a paper read before the Polytechnic Association of the American Institute on the 19th inst. Numerous specimens of the native and artificial compounds of chromium were exhibited for the practical information of members. The author said that the compounds of chromium do not occur very profusely distributed in nature. There are but a few native combinations, some of which are found in small quantities in Siberia and other places, while another, chromic iron, is the only material from which the various compounds of this metal are produced. These compounds are chiefly employed as pigments, which are celebrated for their bright colors.

Chromium is exceedingly infusible, even more so than platinum. It combines with oxygen, forming four different oxides, one of which, Cr_2O_3, enters into combination with oxide of iron to form chromic iron ore, some varieties of which contain as much as sixty per cent. of oxide chromium. Chromic-iron is found in serpentine rocks, gneisses or magnesian rocks. It is quite abundant in Siberia, Styria, the Shetland Islands and Cuba; but the United States contains a large number of localities where it is found in large deposits, viz., California, Maryland, Pennsylvania, Vermont and North Carolina. A specimen from Baltimore yielded of chromic oxide 60.04; protoxide of iron, 26.13; alumina, 11.85; and magnesia 7.45 per cent.

Crocoite, native chromate of lead, was first found in Siberia, and has since been found in Hungary, Brazil and one of the Philippine Islands.

Vauquelinite, chromate of lead and copper, is found in Siberia, and was also discovered by Dr. TORREY, nearly fifty years ago, in a lead mine near Sing-Sing, in this State.

Phœnicochroite, sub-sesqui-chromate of lead, containing 23 per cent. of chromic acid, is found in connection with the minerals already mentioned.

The following compounds of chromium have of ate years been applied to various uses in the arts:

1. The yellow or neutral chromate of potassa, which is used in the preparation of chromic pigments.

2. The bi-chromate of potassa, used in the manufacture of many valuable compounds.

3. The sesqui-oxide of chromium, which is of a dark green color, and is used in oil-painting, glass staining and bank-note printing (making "greenbacks").

4. Chromic acid, which is obtained in the form of ruby red needle-shaped crystals, by adding an excess of sulphuric acid to a solution of the bi-chromate of potash.

5. Metallic chromium, the use of which has been recommended by BERTHIER for the production of a very tough and uniform quality of steel.

Among the uses to which the bichromate has been put, the author mentioned its employment in the manufacture of palm oil soap, for making the aniline color, called *mauve;* for an exciting liquid in galvanic batteries, with an excess of sulphuric acid; in photography, where, in connection with glue, it can be used to replace collodion; in calico-printing, to fasten vegetable colors; and as a topical bleacher.

The yellow and orange chromates of lead in numerous shades constitute excellent pigments, and are largely used in painting.

A considerable portion of the paper was devoted to the method of manufacturing the various salts to which allusion was made, but our limited space prevents our reproducing this portion of the paper, and we can only add that full information on this subject can be found in any good technical chemistry.

The Utilization of Tin Scraps.

We gave last week a condensed summary of the processes heretofore proposed for this important end, concluding with a brief mention of the method of Dr. ADOLPH OTT, now in operation in this city. We commence a more detailed account of the latter, by recapitulating the outline already given.

This method consists in the solution of the tin on the scraps by a mixture of acids, which also dissolve any lead occuring in inferior tin plate. From this solution the lead is precipitated. By immersing sheets of zinc into this solution, now free from lead, the tin is precipitated into a metallic state. This precipitate is washed out with water and smelted into slabs. The acids employed also dissolve 5 per cent. of the *iron*; by the precipitation of the tin a proportionate quantity of zinc goes in solution (about 1 zinc to 2 tin), and the resulting liquid consists, therefore, of a mixture of an iron salt and a zinc salt, which liquid may be employed for burnettizing, as a disinfectant, and may also be used for the preparation of various paints. The iron scraps are first washed in water, then in a weak alkaline solution, then again in water, after which they are barreled and sent to the iron mills. There they go generally into the puddling furnace with other iron. To perform all these changes without great manual labor and expense, was a problem which seems to have been solved in quite a pretty manner. The vessel into which the tin scraps are filled is a perforated copper *drum*, or cylinder, fixed upon an axis, the end of which may be placed upon several bearings, ranged in a semicircle, but equidistant from the pivot, and to this is geared the machinery, giving the drum a rotary motion. Several tanks are so placed in this semi-circle, and also a crane, that the drum may revolve within any of them, and may easily be lifted from the bearing belonging to one vat upon that of another. Steam power is employed. The sheet copper of the drum is 3-10 inch thick at the ends, and $\frac{1}{8}$ inch on the cylinder, the diameter of which is 6 feet 5 inches, length 5 feet 10 inches, perforated with $\frac{3}{8}$ inch holes 2 inches apart, strapped with $\frac{3}{4}$ inch copper rods; there is a double door, 3 hinges on each wing, for filling in clippings and discharging iron. The 4 vats are of equal size, made of $2\frac{1}{2}$ inch pine wood, 4 feet 3 inches deep, 7 feet 2 inches long,

6 feet 4 inches wide. The bearings or journals for the axis are above the rim of the vats, so that only one-half of the drum is immersed in the tank at a time. Each vat measures 192 cubic feet. The first vat, which is to hold the acid, is lined with glass plates, cemented together with zeodolithe (a mixture of soapstone and sulphur). The practical working is this: The first vat is two-thirds filled with commercial muriatic acid of 20° Beaume; this has to last for many rotations. When exhausted, a small percentage of nitric acid is added, by means of which nearly the whole amount of chlorine can be made available, which otherwise would be lost (with 2¾ per cent of nitric acid, 500 lbs. muriatic acid will suffice for a ton of scraps, which without that, would require 1000 lbs.) The charge in the drum averages 950 lbs. of scraps, and the time required for rotation for solution in the first vat, and for washing the iron in the others, together with the discharging of the scrap iron from the drum, is, on the average, 1 hour 11 minutes. With one charge of acid this process can be repeated 38 times, which would require 4½ working days of 10 hours. Four hundred and eighty-two lbs. muriatic and 14 lbs. nitric acid are used up per 2000 lbs. of clippings. About 8000 lbs. of scrap iron are obtained in a day. The acid solution of the first vat, after thorough saturation, is pumped into large copper evaporating vessels, in which it is reduced to one-third its volume. In these pans the small quantity of lead which may be present is, by means of a little sulphuric acid, precipitated as sulphate of lead, which is allowed to settle. The clear solution now containing only tin and iron, is drawn into large wooden tanks, in which it is diluted with twice its bulk of water, and then the precipitation of the tin takes place by means of spelter, 32·6 lbs. of spelter being required for 58 lbs. of tin. To work up 8000 lbs. of clean iron per day, and for all the chemical processes up to the precipitation of the tin, and including the packing of the iron, the unskilled labor of about 6 men is required, which could still be diminished by means of a press to pack the iron. One of the important points in the process is to know exactly the time when the drum has to be lifted from the acid tank, and this has to be carefully ascertained by experience. This fine precipitate of tin sells at 30 cents per lb., 100 lbs. per ton of scrap being obtained on the average.

The price at which the scrap iron is sold is at present $30 to $35 per ton. When the fact is better known in the country at large that pure, clean iron, in thin pieces, is obtainable at that price, it may get into demand for other uses than the puddling furnace. Nothing could be superior to it for the cementation of copper, for heating with crude antimony, for smelting various rich ores, etc.; and there is no reason why it should not be used for steel. Already Mr. Wihl, of the Wihl Manufacturing Co., of Brooklyn, E. D., has converted a large amount of the iron scraps into steel, and various tools have been made from it, the steel being an excellent kind of spring steel, valued at $163 per ton. Mr. Wihl, we are informed, is of opinion that he can turn the same scraps into the best kind of cast steel, valued at $300 per ton. The loss by conversion into steel is no greater than if bar iron were cut up, for in the crucibles no oxidation takes place, and it looks reasonable to suppose that these thin scraps will be much more quickly acted upon by the carbon and cyanogen than thick pieces, and being thus more quickly converted, will melt more rapidly.

The commercial importance of this manufacture may be inferred from the fact that the importation of tin plates into the United States, principally into New York, amounts to over 700,000 boxes per year. The waste from this, by cutting and stamping, amounts to 25 to 30 per cent., and it is estimated that in New York alone and 70 miles around it, 30 tons of clippings can be produced daily, equal to 9000 tons per working year of 300 days. This quantity is as much as 1-15 of the weight of charcoal iron produced in New York, New Jersey, Pennsylvania and Maryland in 1869, or equal to ¼ of the production of the same in the New England States, 1-23 of that of the Western, or ⅔ of that in the Southern States; nor is this quantity less than ¼ of the production of sheet iron in the United States. And this large amount of material until of late was considered as perfectly worthless; manufacturers would pay to have it carted away. The iron, being of best quality is intrinsically as valuable as that composing the best American sheet-iron; still, its loss, owing to the abundance of iron ore in the United States, is of less consequence than that of the tin, which metal bears a high value, and is not, as yet, gained in this country as a commercial product.

Argentiferous Galena in Texas.

Prof. A. R. Roessler, formerly geologist of the Land Office, writes from Austin, Texas, to the Secretary of the N. Y. Liberal Club, on October 11th, that he has discovered a vein of argentiferous galena in that State. In the outcrop the ore is partially oxidized, and yielded, according to an assay by Dr. Genth of Philadelphia, 77·45 per cent. of lead and $371 (286 ounces) per ton in silver.

Prof. R. is deeply impressed with the value of the mineral resources of the State, and proposes, we learn, during the coming winter, to publish a book on the subject.

The copper deposits, which Prof. Roessler described in our columns some months ago, he still regards as showing very flattering prospects for the future establishment of a remunerative copper industry.

EDITORIAL CORRESPONDENCE.

The Sheba Mine.

Star Cañon, Humboldt Co., Nevada,
September, 1871.

One of the earliest and most furious mining excitements in the State of Nevada was that which followed the discovery of the Sheba mine and the organization of the Star district, ten years ago. For a considerable period, this cañon was the scene of an enthusiastic and busy industry; Star City became a flourishing mining town, with two hotels, an express office, daily mails, a telegraph line to Virginia City, and a reported population of more than a thousand inhabitants. Yet in 1868, when I first visited the district, a decline as sudden and rapid as its rise had left of all this prosperity and promise no trace except the empty houses of the town, the abandoned mining works, and the daily mail and the telegraph and express offices, which had not yet been removed. The collapse had been quick and apparently complete; yet a study of the deserted district led me to report at that time to the Government (see my report on mining statistics rendered January 18, 1869, page 127) that it would certainly sooner or later receive attention again. This opinion was based partly upon evidences presented by the district itself, partly upon inferences from its history. It was notorious that the whole community had followed the fortunes of the Sheba mine. Scarcely any other in the district, except the De Soto and perhaps one or two minor enterprises *on the same belt with the Sheba*, had been productive of anything more than assays and prospects. When the ore bodies of the Sheba were exhausted, and the expensive prospecting works of that Company failed to disclose any continuation or repetition of them, the ruin of Star City was inevitable and immediate. But in this very circumstance was the ground of hope for the future. The successful reopening of the Sheba mine would be certain to recall the prosperity which its close had driven away. Moreover, the evidence presented by the mine itself and its surroundings was sufficient to justify the expectation (which has since been realized) that the main deposit, outlying chambers of which had formed the basis of former operations, might be found by more careful and rational search. This point will more clearly appear from a description of the district.

Star City is about twelve miles north of Unionville, at present the principal town of Humboldt county. The Star district lies on the eastern slope of a range of mountains, the highest peak of which (Star Peak) has an altitude of about 11,000 feet above sea-level. The deep, wide and tortuous cañon runs from the summit of the range easterly to the broad dry valley, and collects the waters of a considerable area into Star Creek, which carries 70 miners' inches in the driest summer months and swells to 200 or 300 inches in the early summer, after the snows begin to melt. This stream flows across the outcrops of the metalliferous veins, which mostly course parallel with the range. The débris and gravel are perhaps twenty or thirty feet deep in the bottom of the cañon; and although the mainly argentiferous character of the ore-deposits of the district gave little hint of alluvial gold, yet a company of enterprising prospectors have recently commenced gulch-mining, and are reported to have opened very profitable though limited ground. This occurrence of gold placers below the outcrops of silver mines is not unprecedented. It will be remembered that the Comstock ledge in Nevada was discovered by following up the gulch deposits to which it had given rise. That vein has always since produced a considerable quantity of gold, associated with its silver; but less auriferous silver mines may still, in the course of time have given rise to accumulations of gold in placers. The two metals habitually occur together in nature.

In ascending the cañon, the sections of successive strata may be observed, showing a general north and south course, and a dip westerly, into the mountain. They consist of alternating quartzite, limestone, shales and slates. The first formation crossed above the foot-hills is a metamorphic quartzite, gray when freshly broken, but changing on exposure to brown. The next layer above is a gray limestone, dipping west about 60°, and bedded in layers of a few inches' thickness, the whole group being about 100 yards thick. Overlying this is a large development of black limestone, in which several silver-bearing deposits have been discovered. This is succeeded by gray quartzite, and the latter, in turn, by black slate. Between the two formations last mentioned is a belt or channel, more than 200 feet wide horizontally, of bluish-gray silicious and calcareous rock, characterized by the prevalence of small threads of crystallized quartz, and (on all the cleavages) coatings of talc. It was in this channel that the Sheba deposit was discovered, a few feet only from grass, and close under the hanging wall, bounded, in fact, by the black slate roof above, and by a well-defined horizontal floor in the veinstone below. The first and largest chamber having been worked out, one or two smaller ones were found close by, likewise lying upon the same floor and close to the hanging wall. About $125,000 were extracted from these bodies; and very large sums were expended in the search for further deposits. Quite naturally, the floor which formed the lower limit of those already exploited was supposed to be a foot-wall; and it was expected that one would be again found, if found at all, hugging the hanging wall as before. Consequently, all explorations were confined to this part of the belt, with the exception of a single cross-cut, which was run about 200 feet towards the underlying quartzite. At that time, it was by no means certain that the whole belt between the quartzite and the slate belonged to one vein, and must be considered as veinstone. On the contrary, two other parallel claims were located on the surface, within these limits, upon small stringers or threads of ore, of no real independent importance.

The futile exploring drifts of the Sheba Company, presented one indication which might have led, and did finally lead, to the discovery of the true nature and position of the vein. I refer to the fact that the numerous small stringers of quartz, and sometimes of ore, encountered in the veinstone mass, dropped away towards the distant east or foot-wall. This fact appeared insignificant at the time, in comparison with the encouragement given by the large bodies already found on the hanging wall, to further explorations in that part of the channel. These explorations were expensive, thorough, and utterly barren of results; and the company suspended operations (as so many companies do) just when the negative evidence accumulated would have led them inevitably to continue their search, if they had continued it at all, in the right quarter.

In my next letter I will narrate the subsequent history of this interesting mine, and the discovery of the real Sheba vein, which promises to revive more than the pristine prosperity of this district. R. W. R.

THE COAL TRADE.

B. R. WESTERN, COAL EDITOR.

Anthracite Coals.

NEW YORK, Oct. 27, 1871.

WHOLESALE.—The great feature of the past week was the Scranton Auction Sale, which, in consequence of the low prices realized, has totally upset the market, and almost created a panic. The average decline, as we are informed by the Company, was some 86 cents per ton. This the market was illy prepared for. During the past month, circular prices have been barely maintained, and a general weakness has been manifest. These facts we have, from time to time, faithfully noted to our readers, but to say that we were prepared for any such upheaval as was created at the sale, of course, would be untrue. Nobody was prepared. There is no adequate explanation of the decline. We can only say, that no precedent can be established for the Coal Trade, and almost anything is likely to happen at any time. Auction sales, at best, are very uncertain in their returns. Success or realization of good prices, depends entirely upon the grade of the audience that happens on that day to be present: and in this case, had our largest purchasers—the agents of steamship companies and manufacturers—been present, their large demand would have created a buoyancy and otherwise braced the market. We claim there was no reason by which any such decline can be accounted for, and the truth of the assertion will be shown when at the next sale a reaction will take place Our retail yards are not overstocked; the country is not half supplied for the winter; our manufacturers are in want. With such a state of affairs, how can any sane man account for the decline? But so it is, and it will have to be recorded as one of the panics in the coal trade. The following report of the sale explains itself:

SALE OF SCRANTON COAL—DECLINE IN PRICES.

One hundred tons of Scranton coal were sold by auction yesterday. There was a large attendance, and although the bidding was spirited, the prices realized were much below those obtained the previous month. The following is a comparative statement for the months of September and October.

	TONS.	OCT.	SEPT.
Lump	11,000	$4 00 @3 50	$4 15 @4 27½
Steamboat	12,000	3 85 @3 80	4 47½@4 50
Grate	21,000	4 35 @4.25	5 10 @5 30
Egg	15,000	4 50 @4 35	5 25 @5 47½
Stove	27,000	5 50 @5 35	6 00 @6 15
Chestnut	15 000	3 87½@3 80	4 62½@4 70
	100,000		

The average prices obtained for each size were:

Lump	3 56	Egg	4 35
Steamer	3 83	Stove	4 48
Grate	4 27	Chestnut	3 84

General average, $4 22½.

The above prices closely approximate those of last November, and on which the great strike was inaugurated, which, our readers will remember, lasted far into the spring. It is clear that if better prices are not realized next month, that the "old, old story will be told again." This sale already knocks Schuylkill county out of this market, and hardly pays expenses to those who have to bring their coal but a short distance. We do not wish to be considered alarmists, but we feel justified in holding before our readers the facts, that they may govern themselves accordingly. There is nothing we deprecate more than a long strike. The sale will no doubt compel the other companies to reduce their circular prices for next month about 50 cents per ton.

The market to-day is very quiet, the all-absorbing topic being the sale. Insinuations of a "Coal Ring," "Put up job," "Chicago Fire," "A desire to help the suffering poor," and the like, are freely circulated. All agree, however, that the decline is unprecedented in the Coal Trade.

The retail trade has been affected by the sale. Fifty cents decline is announced by circulars and advertisements. Trade is reported fair in this line.

FREIGHTS are unchanged.

Bituminous Coal Trade, 1870 and 1871.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending Oct. 21, 1871, compared with week ending Oct. 22, 1870.

COMPANIES.	1870. Week.	1870. Year.	1871. Week.	1871. Year.
B. & O. Canal	9,033	426,576	13 454	566,820
C. & O. R. R.	19,976	695,987	24,822	997,099
H. & B. T. R. R.	6 517	250 568	6,243	259,184
Harrisburg & D.	15,092	629,847	16,921	644,893
*L. V. R. R.	1,270	12.213	7.714	324,222
P. & N.Y.C. & R. Co.	6.847	211,866		
Cumberl'd Branch Canal	8 3	73 829	2,963	165,681
" Railroad	4,299	97,045	883	67,293
Total	63,917	2,387,931	73,005	3,015,192
Increase.			63,917	2,387,931
			9,068	627,261

The tonnage of the P. & N. Y. C. & R. R. Co. is included in that of the L. V. R.R. Co

Anthracite Coal Trade for 1870 and 1871.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending Oct. 21, 1871, compared with week ending Oct. 22, 1870.

COMPANIES.	1870. WEEK.	1870. TOTAL.	1871. WEEK.	1871. TOTAL.
*Phila & Reading R.R.	95,666	2,468 219	104.247	3,13 ,746
Schuylkill Canal	26,681	393.897	30,949	847,737
Lehigh Valley R. R.	55,876	2,513.137	75.319	1,833,424
Lehigh & Sus. R. R.	25,620	818.679	34.453	986,485
Lehigh Canal	27,117	616. 315	34.159	577,880
Scranton North	10.767	603.434	19,830	417.423
" South	40 404	1,41 .175	42,723	907 968
Penn. Coal Co., rail	24,422	933 908	25.082	568 804
" " " canal	112	14,582	976	12.159
Del. & Hud. Canal Co.	20,987	1,146,279	36.726	877,1 9
" " East	13,493	330 116	11.227	257,338
" " West	1,950	67.342	4,214	90,109
South	11,061	568,8 1	10, 51	249,936
Shamokin	10,615	290.357	13,425	518,891
Trevorton	....	67 374	....	....
Lykens Valley Coal Co.	....	47,625	....	71,965
Wyoming South	....	238,824	....	....
Wyoming North	....	....	....	4,167
P. N. Y. C. & R. R. Co.	4.644	245.538	....	104,987
Williamstown Co'y.	6,913	243,965	....	....
Big Lick Col.	....	65,149	....	113,791
Total	375,413	13.005 646	443,881	11,508,919
1870		11,508,919	375,418	
Decrease		1,496,727		
Increase			68,463	

* Less coal transported for Co's use and Bituminous coal.

Philadelphia & Reading Railroad and Branches.

— COAL TONNAGE

For the Week ending Saturday, October 21, 1871.

BY RAILROAD—ANTHRACITE.

PASSING OVER MAIN LINE AND LEB. VAL. BRANCH.

	Tons. Cwt
From St. Clair	35.311 12
" Port Carbon	8.828 08
" Pottsville	1.951 04
" Schuylkill Haven	31 939 11
" Pine Grove	6.300 02
" Tamaqua	16.578 08
" Harrisburg	
" Dauphin	6.735 04
Total	107,644 09

FOR SHIPMENT BY CANAL.

Passing Frackville Scales	6,962 14
" Mill Creek "	1,459 18
" Schuylkill Valley Scales	1,050 17
" Mt. Carbon "	1,332 03
" Cressona "	13.392 01
" Pine Grove "	
" Tamaqua "	2,890 07
Total	27,088 00

SHIPPED WESTWARD VIA NORTHERN CENTRAL RAILROAD.

Passing Locust Gap	1 246 00
" Shamokin	4,738 08
" Herndon	
Total	5,984 08

SHIPPED WEST OR SOUTH FROM PINE GROVE.

Via Schuylkill & Susquehanna R. R.	1,410 13
" Lebanon & Pine Grove Branch	1,369 04
Total	2,779 17

CONSUMED ON LATERALS.

From Frackville Scales	827 10
" Mill Creek "	715 10
" Schuylkill Valley Scales	266 04
" Mt. Carbon "	746 06
" Cressona "	537 01
" Pine Grove "	272 16
" Tamaqua "	311 07
Total	3,671 14

LEHIGH AND WYOMING COAL.

Received via Allentown, E. Penn'a Br.	283 09
" " Alburtis, " "	29 00
" " Oreland, G. & N. Br.	885 07
" " Connecting R. R.	
" " Willow Street R. R.	180 14
Total	1,378 10

BITUMINOUS.

From Harrisburg	9.185 13
" Connecting R. R., G. & N. Br.	
" Junction R. R.	238 14
Total	9,424 07

COAL FOR COMPANY'S USE.

Anthracite	4 841 08
Bituminous	277 07
Total.	5,118 15

RECAPITULATION.

	Total for Week.	Corresponding week last Year.	
Passing over Main Line and Leb. Val Branch	107 644 09	101,908 04	i 5,736 05
For Shipment by Canal	27,088 00	26,406 06	i 681 14
Shipped Westward via Northern Central R. R.	5,984 08	2,552 12	i 3,431 16
Shipped West or South from Pine Grove	2,779 17	1,423 08	i 1,356 09
Consumed on Laterals	3,671 14	3,012 05	i 659 09
Lehigh and Wyoming Coal	1,378 10	194 07	i 1,184 03
Total Anthracite paying fr'gt	148 546 18	135,487 02	i 13,059 16
Bituminous	9,424 07	9,083 18	i 340 09
Total of all kinds paying fr'gt	157,971 05	144,571 00	i 13,400 05
Coal for Company's use	6,118 15	4,265 14	i 853 01
Total Tonnage for Week	163,090 00	148,836 14	i 14,253 06
Since Dec. 1, 1870	4,93118017	3.06042 05	i122)127 12
Total to date	5.094259 17	3854878 19	i1239380 18

SHIPPED BY CANAL.

	Total for Week.	Corresponding week last Year.	
From Schuylkill Haven	27,790 00	26,383 10	i 1,406 10
" Port Clinton	3,159 00	341 0	i 2,818 00
Total Tonnage per Week	30 949 00	26 724 10	i 4,224 10
Since Dec. 1, 1870	816,787 17	372.148 01	i 444639 16
Total to date	847,736 17	398,872 11	i 448864 06

Report of Coal Transported over Lehigh Valley Railroad

Report of coal tonnage for week ending Oct 21, 1871, previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL Tons. Cwt
Total Wyoming	17,738 10	482,280 04
" Hazleton	53,368 05	1,059,616 10
" Upper Lehigh	79 10	1 874 01
" Beaver Meadow	18.371 00	383,795 08
" Mahanoy	12,649 06	436 704 01
" Mauch Chunk	170 05	7. 335 00
" Sullivan & Erie	849 10	4,600 19
Total Anthracite	103,225 06	2,376,206 03
Bituminous Coal from all sources	7,713 11	324,222 01
Total by rail and canal	110,938 17	2,700,428 04
Same time last year	74,076 01	3,212 290 16
Increase	36,862 16	
Decrease		511,862 12
Forwarded East from Mauch Chunk by rail	75,318 14	1,833,423 18
Same time last year	55,876 06	2,513,137 10
Increase	19,442 08	
Decrease		679,713 12

RECAPITULATION.

Forwarded East from Mauch Chunk by rail	75,318 14	1,833,423 18
To N. C. R. R., at Mount Carmel		4,290 06
Forwarded North from L. & B. Junction	10,824 19	256,870 01
To L. & S. R. R. at Packerton for rail	228 11	5,737 00
Delivered at M'h Chunk	104 04	1,151 11
Delivered on line of road above Mauch Chunk		
Delivered above MauchChunk for use of L. V. R.R.	389 12 1,219 04	9,696 16 42,722 06
To L. & S. R. R., at Penn Hav., for railroad		94 10
Do. for canal	11,161 16	162 754 12
At M.Chunk for canal	3,978 02	59,411 03
Total Anthracite	103,225 06	2,276,206 03
Bituminous Coal	7,713 11	324,222 01
Total all kinds	110,938 17	2,700,428 04

This report includes all Bituminous Coal carried over the Lehigh Valley and P. & N Y. Railroads from December 1st, 1870, to date.

Report of Coal Transported over Central R.R. of N. J. (Lehigh and Sus. Div.)

Week ending Oct. 21—Compared with same time last year.

WHERE SHIPPED FROM	WEEK 1871., tons ct	WEEK 1870. tons ct.	YEAR 1871 tons cwt.	YEAR 1870. tons. cwt.
Wyoming Region	35741 11	31432 01	1014603 09	992177 13
Upper Lehigh Region	4214 00	3.53 18	73239 12	122892 01
Beaver Meadow Region				
Hazleton Region	11739 11	8912 03	161937 12	263458 10
Mahanoy Region				
Treskow Region	3239 12		55342 00	
Mauch Chunk Region	6793 10	4326 19	169231 11	86718 12
Totals	61758 04	48125 01	1474414 04	1462248 16
Increase	13633 03			
Decrease			12167 08	
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	34453 00	25619 14	986485 05	818679 08
Forwarded East of Mch Chunk by Canal		10824 07	33.091 09	42679 19
Delivered at and above Mauch Chunk	20251 12 3196 17	945 10	52571 03	35517 00
Delivered to L. & B. R. R.at PlymouthBridge	3472 14	4347 01	77116 06	160709 02
L. V. R. R at Packer'n	434 01	398 09	26149 16	20544 07
Totals	61758 04	48125 01	1474414 04	1462246 16
Of the above there was transported on acc'tn of L. C. & I. Co	10752 19	6381 15	249386 18	119772 06
W.-B. C. & I. Co	20555 13	18033 04	684871 03	484309 19
Totals	51308 12	24414 19	934258 04	604082 05
Increase	6893 13		330175 19	
Decrease				

Pennsylvania Coal Company.

Shipments of Pittston Coal for the week ending Oct. 21, 1871.

	1871. WEEK.	1871. YEAR.	1870. WEEK.	1870. YEAR.
By Railway	25,0 2 01	568,804 07	24,422 09	933,908 09
" Canal	976 09	12,158 15	112 03	14 5-1 19
Total	26,0 8.10	580,963 02	24,534 12	948,490 08
Decrease 1871, 367,527 06				

Philadelphia and Reading R. R.

Amount of coal transported on the Philadelphia and Reading Railroad during the week ending Saturday, Oct. 21, 1871:

	tons, cwt
From St. Clair	35,311 12
" Port Carbon	8,828 08
" Pottsville	1,951 04
" Schuylkill Haven	31,939 11
" Auburn	9.325 00
" Port Clinton	16,578 08
" Allentown and Alburtis	312 09
" Harrisburgh and Dauphin	16 920 17
Total paying freight	121,167 09
Coal for Company's use	5 118 15
Total for week	126,286 04
Previously this year	3,718.970 06
Total	3,845,256 10
To same time last year	3 159,002 16

Schuylkill Canal.

Report of coal transported over the Schuylkill Canal for the week ending Saturday, Oct 21, 1871.

	Tons. Cwt.
rom Port Carbon	
" Pottsville	
" Schuylkill Haven	27,790 00
" Port Clinton	3,159 00
Total for week	30 949 00
Previously this year	816,787 17
Total	847,736 17
To same time last year	593,896 11

Lehigh Coal and Navigation Company,

Report of Coal transported over the Lehigh Canal and L. & S. Div. of Central Railroad of New Jersey for the week ending Oct. 21, 1871, and for the year 1871.

		WEEK.	YEAR.
Forwarded East of Mauch Chunk by Rail		34,453	986,485
Delivered at and above	do.,	3,196	62,571
Forwarded East of	do., by Canal.	34,159	577.879
		71,809	1,616,936
Corresponding period last year—			
Forwarded East of Mauch Chunk by Rail		25,619	818,679
Delivered at and above	do.,	945	35,517
Forwarded East of	do., by Canal.	27,116	616,315
		53,681	1,470,511
Increase on Railroad		11,084	184,860
Decrease " "			
Increase on Canal			
Decrease " "		7,042	38,435
Of the above there was transported on account of—			
Lehigh Coal Nav. Co		21,700	460,487
Wilkesbarre Coal & Iron Co		20,555	684,871
		42,256	1,145,358
Corresponding period last year—			
Lehigh Coal Nav. Co		14,342	189,374
Wilkesbarre Coal & Iron Co		18,033	484,309
		32,375	673,684
Increase		9,880	471,674

Delaware and Hudson Canal Company.

The following is a statement of Coal Transported by the Delaware and Hudson Canal Co. for the week ending Oct. 21, 1871.

	FOR THE WEEK.	FOR THE SEASON.
By Delaware and Hudson Canal,	36,726	807,109
By Railroad, East	11,227	257,338
" " West	4,214	90,109
" " South	10,551	249,936
Total Tons	62,718	1,404,492

For the same period last year.

	FOR THE WEEK.	FOR THE SEASON.
By Delaware and Hudson Canal,	20,987	1,146,279
By Railroad, East	13,483	330,116
" " West	1,050	67,342
" " South	11,061	368,831
Total Tons	46,581	1,912,568
Decrease		

Delaware Lackawanna & Western Rail Road Company.

Coal transported on the Delaware, Lackawanna and Western R. R. for week ending October 21, 1871.

	Week. Tons. Cwt.	Year. Tons. Cwt.
Shipped North	19,829 17	417,422 14
Shipped South	42,723 01	727,968 08
Total	62,552 18	1,325 391 02
For the corresponding time last year:		
Shipped North	10,767 09	603,434 10
Shipped South	40,404 06	1,431,174 12
Total	51,171 15	2,034,609 02
Increase	11,381 03	
Decrease		709,218 00

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company for the week ending Saturday, Oct 21, 1871.

	WEEK.	SEASON.
North	55,819 11	1168,717 12
South	10,551 05	249.935 16
Total	66,370 16	1418,653 08
Corresponding time in 1870:		
North	31,210 08	1,729,630 16
South	11,061 08	368,830 12
Total	42,271 16	2,089,461 08
Increase North		
Decrease South		
Total increase 1871	24,099 00	
Total decrease 1871		670,808 00

Statement of Coal Transported over Cumberland and Pennsylvania Railroad

During the week ending Saturday Oct. 21, and during the year 1871, compared with the corresponding period of 1870.

WEEK.

	To C. & O. Canal Tons. Cwt.	To B.&O. R.R. C. Tons. Cwt	Total. Tons Cwt.
1871	13,453 11	24,821 19	38,275 00
1870	9,032 18	19,975 18	29,008 16
Increase	4,420 13	4,845 11	9,266 04
Decrease			

YEAR.

1871	566,819 17	997,098 13	1,563,918 10
1870	426,576 07	685,987 03	1,112,563 10
Increase	140,243 10	311,111 10	451,355 00
Decrease			

Cumberland Branch

WEEK,

	To C. & O. Canal. Tons. Cwt.	To B.&O.R.R. Co Tons Cwt.	Total. Tons Cwt.
1871	2,967 12	830 08	3,798 00
1870	883 10	4,299 05	5,182 15
Increase	2,084 02		
Decrease		3,468 17	1,384 15

YEAR.

1871	165,681 08	57,293 03	222,974 11
1870	73,828 13	97,045 01	170,873 14
Increase	91,852 15		52,100 17
Decrease		39,751 18	

Huntington and Broad Top R. R. Co.

For week ending Oct. 21, 1871	6,243 tons.
Same time last year	6,517 "
Increase	
Decrease	274 "
Total amount shipped to date	259,184 "
Same time last year	250,568 "
Increase	8,616 "
Decrease	

Shamokin Coal Trade.

For week ending October 21, 1871	13,425 05
Same time last year	10,615 02
Increase	2,810 03
Decrease	
Total amount shipped to date	518,890 15
Same time last year	390,356 16
Increase	128,533 19
Decrease	

Line Prices for Coal Oct, 1871,

	Lump	Broken	Egg	Stove	Ches'.
At Mauch Chunk	4.00	4.00	4.00	4.25	3.00
*Wilkesbarre	3 75	3.75	3.75	4.00	3.00

Company Coals.

Oct, 1871.

	L.	Str.	Gra	Eg.	Sto.	Chest
*Scranton at E. Port	- —	- —	- —	- —	- —	- —
*Pittston at Newburgh	5 10	5 10	5 30	5 40	5 80	5 10
*Lackawana at Rond't	5 10	5 10	5 33	5 60	5 95	5 10
Wilk'b're at Hoboken	4 65	4 75	5 75	5 75	6 25	5 25
Old Co. Lehigh at PtJohn'n	6 25	6 25	6 25	6 25	6 50	5 50
Lehigh at Eliz. Port	6 25	6 25	6 25	6 25	6 50	8 50

For freights to different points see "Freights.

* To contractors.

* None to sell.

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

	AT NEW YORK, Oct. 1. R. A.	W. A.	AT PHILADELPHIA. Oct. 1. R. A.	W. A.
SCHUYLKILL.				
Lump	$- —	$- —	- —	- —
Steamer	6 00	- —	- —	4 50
Broken	6 00	- —	- —	- —
Egg	- —	- —	5 00	4 75
Stove	6 25	- —	5 00	5 00
Chestnut	5 00	- —	- —	- —
Pea	- —	- —	- —	- —
LEHIGH.				
Lump, (along side)	6 50	—	- —	- —
Broken	6 50	- —	- —	- —
Egg	6 50	- —	- —	- —
Stove	6 50	- —	- —	- —
Chestnut	5 50	- —	- —	- —
Pea	- —	- —	- —	- —
SPECIAL COALS.*				
Diamond Vein	R. A. 6 00@6 25		- —	- —
New England	"	—	- —	- —
Locust Mountain	W. A.	6 50	- —	- —
Honey Brook, Le'h	W. A.	5 50@6 25	- —	- —
Spring Mountain	" "	5 50@6 25	- —	- —
Sugar Creek	" "	5 50@6 25	- —	- —
Sugar Loaf	" "	5 50@6 25	- —	- —
Old Comp'y's	" "	5 50@6 25	- —	- —
Cross Creek	" "	5 50@6 25	- —	- —
Room Run	"	5 50@6 25	- —	- —
Girardville	" "	- —	- —	- —
McMichael	" "	- —	- —	- —
Shamokin	" "	5 25	- —	- —
Lykens Valley	" "	5 75	- —	- —
Broad Top	" "	5 25	- —	- —
Hill & Harris	" "	- —	- —	- —
Henry Clay	" "	- —	- —	- —
Powelton	"	5 25	- —	- —

*Dealers in these coals may be found in our advertising columns

Prices at Baltimore—Oct, 1871.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$5 00@5 85
Pittston and Plymouth, do	- —@5 60
Shamokin Red or White Ash, do	- —@5 60
Lykens Valley Red Ash, do	- —@6 30
Zerba Valley	- —@- —
Trevroton	- —@- —
By retail, all kinds per ton of 2240 lbs.	7 00@8 25
Georges Creek & Cumberland f. o. b. at Locust Point for cargoes	- —@4 75
Fairmount and Clarksburg gas, f. o. b. at L. Point	6 00@6 50
BITUMINOUS COALS.	
Kittaning Coal Co.'s Phœnix Vein..f.o.b. at Phila	$ —
Lemon " " "	—
Cumberland Vein Coal	—
Consolidation Coal Co.'s on board N. Y.	6 75
Maryland Coal Co. " " "	6 75

Prices at Georget'n, D.C., & Alexandria, Va.

Oct, 1871.

George's Creek and Cumberland f. o. b. for shipping...$4 35@4 50

Prices at Havre de Grace, Md.

Wilkesbarre and other White Ash for cargoes	$5 25@5 50
Lykens Valley	6 25@6 50
Shamokin Red or White Ash	5 50@5 75
Trevorton and Zerba Valley	- —@—

Prices of Gas Coals.

Oct, 1871.

PROVINCIAL.

Corrected weekly by Louis J. Belloni, Jr.,41-43 Pine st., N. Y

Duty, $1 25, gold

	Coarse.	Slack.
Block House	$1 75	@-1 75
Gowrie	1 75	@-1 75

Corrected by Bird, Perkins & Job, 86 South street.

	Coarse.	Culm of Coal
Pictou	$2 25	@1 25
Sydney	2 25	@- 80
Lingan	1 60	@- 80
Little Glace Bay	1 60	@1 00
Caledonia	1 60	@- 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty $1 25 per ton, gold, on the coarse coal. 25 per cent. ad valorem on the Culm of Coal.

AMERICAN.

	Currency.
Westmoreland	$7 00 @- —
Fairmount Gas Coal Co. of N. Y.	7 00 @- —
Despard Coal Co	7 00 @- —
Penn	7 00 @- —
Newburg Orrel Gas	- —@- —
West Fairmount Gas Coal	7 00 @- —
AT PHILADELPHIA.	
Powelton	$6 75
TO NEW YORK.	
Provincial.	
Sidney	$3 25
Lingan	3 25
Cow Bay	3 37½
Port Caledonia	3 37½
Little Glace Bay	3 25

Freights.—Oct, 1871.

TO EASTERN PORTS.	Cumberland. From Georgetown.	Cumberland. From Baltimore.	Anthracite. From Philad'a.	From East Port, Port Johnston, and Hoboken.	From Newbury...	From Rondout...
Amesbury			$2 50	$1 95		
Bangor	$2 75		2 25	1 70		
Bath	2 75	2 65	2 35	- —		
Boston	2 60	2 60	2 25	1 85	180	1 85
Bridgeport	2 25	2 30		1 10	1 10	1 25
Bristol		2 60		1 50		1 50
Cambridgeport			2 35	1 85		
Derby				1 25		
Dighton	2 30	2 35		- —		
East Cambridge				1 85		
Fall River	2 25	2 30		1 40	1 40	
Hackensack						
Hartford	2 75	3 00	2 40	1 50		
Jersey City		2 00		80	70	
Middletown				1 25		
Mystic			- —	1 25		
New Bedford	2 50	2 35	2 00	1 40		
Newburyport	2 75			1 90		
New Haven	2 25	2 30		1 15	1 10	1 35
New London	2 25	2 30	1 95	1 25		2 20
Newport				1 40		1 25
New York	2 00	1 90	1 40	75	70	1 40
Norwalk		2 30		1 10	1 10	65
Norwich	2 25	2 30		1 20	1 40	
Pawtucket	2 50	2 50	2 15	1 20		1 50
Portland	2 50	2 60	2 40	1 70		1 65
Portsmouth, N.H	2 75	2 75		2 00		2 00
Providence	2 25	2 30	2 00	1 40	1 50	1 50
Rockport						
Saco	2 75		2 65	- —		
Sag Harbor				1 20		
Salem	2 60	2 65	2 25	1 80		
Stamford				1 10	1 10	
Stonington				1 25	1 20	
Taunton				1 80		1 40
Warren			- —	1 40		
Washington			1 25			*
TO RIVER PORTS.						
Albany		80			55	
Catskill		70			50	
Cocksackie		70			50	
Coeyman's		70			65	
Cold Spring	2 20	70			30	
Fishkill		70	1 60		30	
Haverstraw					60	
Hudson	2 20	2 25			40	
New York					60	
Nyack			1 75		30	
Poughkeepsie					30	
Rhinebeck						
Rondout					75	
Saugerties			1 60		40	
Sing Sing					75	
Stuyvesant					75	
Tarrytown					75	
Troy					55	
West Point			1 75			
Yonkers					60	

Prices of Foreign Coals.

Oct, 1871.

Duty $1 25 per ton.

Corrected weekly by PARMELE BROS., No 32 Pine street, N. Y.

Liverpool Gas Caking	$ 8 00@— —
" Cannel	10 50@12 00
" House "	— —@16 00
" Orrel	12 00@14 00

Per ton 2,240 lbs., ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$16 00@17 50
"Cannel, "	18 00@20 00

Per ton 2,000 lbs. delivered.

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkill Haven for consumption	$2 10
For reshipment	2 00

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Phillipsburgh	$0 92
C. R. R., N. J., Phillipsburgh to Elizabethport	1 88
Shipping expenses at Elizabethport	25
Wharfage	10
Total	$2 15

MAUCH CHUNK TO PORT JOHNSON.

L. V. R.R., or L. & S. R.R. from M. C. to Phillipsb'g	$0 92
C. R. R., of N. J., Phillipsburgh to Pt. Johnson	1 88
Shipping expenses	25
Wharfage	10
Total	$2 15

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Phillipsburgh	$ 92
Morris & Essex R. R. Phillipsburgh to Hoboken	1 88
Shipping expenses	20
Wharfage	16
Total	$2 15

TO SOUTH AMBOY.

L. V. R. R.	92
B. & D. R. R. / Cam. & Am. R. R.	1 81
Shipping Expenses	35
Total	$2 08

PENN HAVEN TO ELIZABETHPORT.

L. V. R R. Penn Haven to Phillipsburgh	90
C. RR. of N. J. Phillipsburgh to Elizabethport	126
Shipping expenses	25
Wharfage	10
Total	$ 2 51

BY CANAL.

Via Schuylkill Canal.

TO PHILADELPHIA.

From Schuylkill Haven	Toll..$1.35	Freight..95c	$2 30
" Port Carbon			
" Port Clinton	" 1.88	" 55c	2 23

Drawback 15 cents during August.

NEW YORK.

From Schuylkill Haven Toll..1 10 Freight..$2 00..$3 10

The Rates of Toll on Lump and Steamer Coal will be ten per cent less than the above rates. The charge will be per ton of 2240 lbs. No charge less than Forty Cents per ton will be made for any distance. A drawback of thirty cents is allowed on all coal passing Fairmount Locks used at Philadelphia and vicinity.

Via Lehigh Canal.

TO PHILADELPHIA

Lehigh Canal	$ 80
Freight and towage	1 10
Total	$1 90

TO NEW YORK.

Lehigh Canal	$1 57
Morris Canal, Freight, Towing	208
Total	$2 65

TO JERSEY CITY.

Lehigh Canal	$ 44
Morris Canal, Freight	2 06
For re-shipment	2 50

Via Delaware and Raritan Canal.

TO NEW YORK.

Lehigh Canal	$ 57
Delaware Division Canal	38
Delaware and Raritan Canal	
Freight	1 25
Towage	20
Total	$2 6

TO NEW BRUNSWICK.

Lehigh Canal	
Delaware Division Canal	$75
Delaware and Raritan Canal	50
Freight	1 20
Total	$2 39

MARKET REVIEW.

FOR THE WEEK ENDING OCTOBER 28, 1871.

IRON—The demand for Scotch Pig continues light, and prices, although without quotable change, have a softening tendency—we have only to notice sales of three hundred tons Glengarnock, ex-ship, on private terms. The demand for American has been confined to small parcels, but the supply is moderate, and full rates are maintained—two hundred tons No. 2 Lehigh, sold at $36. The demand for Wrought Scrap continues moderately active, and we notice sales of three hundred tons, to arrive, at $38@38 50. American Rails have been in improved request—English are inactive but steady—the sales are three hundred tons new Street at $76, and 2,500 do. American Rails, on private terms. Refined Bar from store is steady and firm at our quotations, with a fair demand. We repeat what we said in our last, that the meeting, of most of the makers in the Atlantic States, held here on the 17th inst., unanimously resolved to adopt the schedule of May 16th, and the decimal system of prices for extra sizes, all makers being uniform for these sizes. Russia Sheet is very quiet, but nominally unchanged—No. 1 Stained is held at 13½ cents gold.

LEAD—Pig is dull, and we hear of no sales; we quote ordinary as before, say $5.95 gold. Manufactured continues steady at our quotations, as for a long time past.

COPPER—The manufacturers of Copper and Yellow Metal are steady at our quoted rates. Ingot is very quiet, and in prices, with scarce money, there is some irregularity; the transactions embrace 75,000 lb. Lake at 23⅜ cents, and 75@85,000 lb. do. at 23½, cash.

SPELTER—There is a better inquiry for Foreign, and the market has more tone than before. Silesian is held firmly at 6½ cents gold; 50 tons gold to arrive, at a private price. Domestic, 7 cents currency.

STEEL—The market continues very steady at old prices, with a regular moderate trade demand.

TIN—The demand for Pig continues light, and there is scarcely sufficient business to establish quotations; we have only to notice sales of 150 slabs Straits at 36¼@36½ cents, English 34¼@35, and Banca 41½, all gold. Plates have become quiet, but prices generally are well sustained; sales have been made of 1000 bxs. Charcoal Tin at $8,7½ for I. C.; 300 do. Charcoal Terne, $8,12¼@$8,25; and 200 do, B. C. Coke Terne, $6,31¼ (now held at $6,37¼ @6,50), all gold.

ZINC—Sheet is steady and firm, with a fair demand at our quotations—100 casks Mosselmann sold from agents hands, to arrive, at 8¼ cents, less 4 per cent., and 25 do. from dealers hands. 8⅛, net, all gold. Manganese black-oxide, 4¼ currency; do. Pyrolusite, 5¼ currency.

METALS.

NEW YORK, Oct. 28, 1871.

IRON.—Duty: Bars, 1 to 1¼ cents ℔ lb; Railroad, 70 cents ℔ 100 lbs.; Boiler and Plate, 1½ cents ℔ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ℔ lb; Pig, $7 ℔ ton; Polished Sheet, 3 cts. ℔ lb; Galvanized 2½; Scrap Cast, $6; Wrought, $8 per ton.

	Store Prices.
Pig, Scotch No. 1, ℔ ton	35 00@38 50
Pig, American, No. 1	37 00@38 00
Pig, American, No. 2	35 00@36 00
Pig, American, Forge	33 00@34 00
Bar Refined, English and American	80 00@— —
Bar Swedes, assorted sizes (gold)	85 00@100 00
	Store Prices, Cash.
Bar, Swedes	107 50@120
Bar, Refined, ord'y sizes	85 00@— —
Bar, Refined, 1¼ to 6 by ¼ @ 5-16 inch	— —@ 90 00
Bar, Refined, 1 & 1½ by ¼ & 5-16	— —@ 92 50
Bar, Refined, 2½ to 3 Round & Square	— —@ 92 50
Scroll	102 50@132 50
Ovals and half-round	102 50@122 50
Band	— —@ 97 50
Horse Shoe	100 00@105 00
Rods, ⅝ to 2-16 inch	90 00@125 00
Hoop	107 50@150 00
Nail rod	6¾@— —
Sheet, Russia, as to assortment (gold)	17¼@18
Sheet, Single, D. and T. Common	—4¾@— 5¾
Sheet, D. and T. Charcoal	—5¼@—6¼
Sheet, Galv'd, Nos. 14 to 26 27½ to 30 ct. dis.	12@14c ℔
" " Nos. 27, 28, and 29 27½ to 30 ct. dis.	15@18c ℔
Rails, English (gold), ℔ ton	57 00 @59 00
Rails, American, at Works in Pa	70 00 @71 00

STEEL—Duty: Bars and ingots, valued at 7 cents ℔ lb or under, 2¼ cents; over 7 cents and not above 11, 3 cents ℔ lb; over 11 cents, 3½ cents ℔ lb, and 10 ℔ cent ad val. (Store prices.)

English Cast (2d and 1st quality) ℔ lb	— 15 @— 18
English Spring (2d and 1st quality)	— 7 @— 10
English Blister (2d and 1st quality)	— 10 @— 17
English Machinery	— 11 @— 13
English German (2d and 1st quality)	— 10½@— 12
American Blister "Black Diamond"	— — @— 12
American, Cast, Tool do.	— 15 @— 16
American, Spring, do.	— 9 @— 11
American Machinery, do.	— 9 @— 10
American German, do.	— 9 @— 11

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 4 cents ℔ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ℔ lb	— @— 32
Copper Bolts	— @— 34
Copper Braziers, 16oz. and over	— @— 34
Copper Nails	— @— 39
Copper, Old Sheathing, &c. mixed lots	20 @— 21
Copper, Old, for chemical purposes, 14@16 oz	23½@— —
Copper, American Ingot	23½@— —
Yellow Metal, New Sheathing & Bronze	— @— 22
Yellow Metal Bolts	25 @— —
Yellow Metal Nails	— @— 24

SPELTER—Duty: In Pigs, Bars & Plates, $1.50 p. 100 lb

Plates, Foreign (gold) p. 100 lb.	5 75 @ 6 12½
Plates, Domestic p. lb.	— 7 @— 11

LEAD.—Duty: Pig, $2 ℔ 100 lbs.; old Lead, 1½ cents ℔ lb; Pipe and Sheet, 2¾ cents ℔ lb.

Galena, ℔ 100 lbs	$— — @— —
Spanish (gold)	5 95 @6 00
German, do.	5 95 @6 00
English do.	6 15 @6 50
Bar (net)	9 25 @ —
Pipe (net)	— — @10 25
Sheet	— — @10 25

Colwell, Shaw & Willard Tin-Lined Lead Pipe 15 cts. ℔ lb.

TIN.—Duty: Pig, Bars, and Blocks, 15 ℔ cent. ad val.: Plate and Sheets and Terne Plates, 25 ℔ cent.; Roofing 25. ad val.

	Gold ℔ lb.
Banca	41¼@41½
Straits	36⅛@36½
English	34¾@35

PLATES.

Fair to Good Brands.	*Gold.*	*Currency.*
I. C. Charcoal, ℔ box	$8 75 @9 00	$10 25 @10 75
I. C. Coke	7 50 @8 50	9 00 @10 00
Coke Terne	6 37½@7 50	7 25 @ 9 00
Charcoal Terne	7 75 @8 25	9 50 @10 00

ZINC—Duty: Pig or Block, $1 50 ℔ 100 lb.; Sheet, 2½ cts. ℔ lb.

Sheet, No. 9 Foreign ℔ lb.	@— — 9½ @ 10

San Francisco Stock Market.

Our report from the San Francisco Mining Stock Board is dated the 24th inst. The market is quite active, with about the same prices ruling as given in our last. The only noteworthy change is the decline in Raymond & Ely, which is placed on the list at $97, it having gradually fallen to that figure during the operations of the week. Gould & Curry was quoted on the 21st inst. at $107, which is an advance on our last report. Kentuck follows a parallel course with Raymond & Ely, being now quoted at $160. Eureka G. V. is coming into prominence in the operations of the Board, and if we may judge from indications, it bids fair to attain the importance on the list that is now conceded to many others whose beginning was not so promising. The report is as follows:

Savage	42⅛
Yellow Jacket	59
Kentuck	150
Chollar Potosi	31½
Gould & Curry	No Sales.
Belcher	385
Imperial	45
Crown Point	305
Raymond & Ely	97
Hale & Norcross	No Sales.
Eureka G. V.	19½

Petroleum is firm, with the single exception of United Petroleum Farms, which item has declined 10 cents per share during the week. United States is the most prominent feature in the advance list. No sales. The following is the full report of the Board:

PETROLEUM STOCKS.

	BID.	ASKED.
Bennehoff Run	20	—
Bergen Coal and Oil	15	—
Bliven Oil	30	—
Blood Farm	—	—
Brevoort	25	—
Buchanan Farm	40	—
Central	60	—
Clinton	—	—
Home	1 60	—
National	—	—
New York & Allegheny	50	—
Northern Light	35	—
Phillips Pet	—	15
Pithole Creek	—	1 00
Rathbone Oil	20	—
Rynd Farm	30	—
Second National	—	40
Sherman & B	—	—
Tarr Farm	—	—
United Petroleum Farms	—	30
United States	—	60

Mining Stocks.

The following list of quotations from the Mining Stock Board is almost a counterpart of the list given a week ago. The only changes compared with the report of the 19th are a slight advance in Gregory and LaCrosse, and a decline of Smith & Parmlee. No sales.

GOLD STOCKS.

	BID.	ASKED.
American Flag	—	20
Bates & Baxter	25	—
Benton	—	5
Black Hawk	50	—
Central Gold	2	4
Cons Gregory	—	40
Grass Valley	7	8
Gunnell	10	—
Holman	—	—
La Crosse	18	22
Liberty	—	—
Mariposa prf.	—	—
Montana	—	—
Rocky Mount	—	5
Quartz Hill	20	20
Smith & Parmlee	20	—
N. Y. & Eldorado	—	—

Plate Testing.

To test the genuineness of silver plating on metals, a cold saturated solution of bichromate of potash in nitric acid is applied with a glass rod to the cleaned (with strong alcohol) metallic surface, and immediately washed off with pure cold water. If pure silver be present, there will appear clearly a blood-red colored mark (chromate of silver). Upon German silver the test liquid appears brown, but after washing with water, the blood-red colored mark does not appear; the so-called Britannia metal is colored black; on platinum no action is visible; metallic surfaces coated with an amalgam of mercury yield a reddish speck, which, however, is entirely washed off by water; on lead and bismuth the test liquid forms a yellow-colored precipitate; zinc and tin are both strongly acted upon by this test liquid, which, as regards the former metal, is entirely removed by water, while, as regards the latter, the test liquid is colored brownish, and an addition of water produces a yellow precipitate, which somewhat adheres to the tin.

DIAMONDS AND CARBON furnished and set for drilling rock, sawing or working stone, also *Glasier's Diamonds*. See ENGINEERING AND MINING JOURNAL, January 17, 1871, for further particulars.
Address: JOHN DICKINSON, 64 Nassau st., N. Y.
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This is the best Scraper in use, and more of them are sold than of all other kinds. It will save its cost in a week.
Price one dollar per inch to fit all sizes from 1¼ to 4 inch tubes.
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Novelty Works, Detroit, Mich.
Northwestern Mfg. Co., Chicago, Ill.
Post & Co., Cincinnati, Ohio.
C. Dugan & Co., Baltimore, Md.
Sep-17-tf

WHITE, FOWLER & SNOW.
Wilkesbarre and Lehigh Coal,
FOR STEAM AND FAMILY USE.
OFFICE:
Room No. 49, 111 BROADWAY, (Trinity Building).
JNO. WHITE,
jan1-1y LINDLEY H. FOWLER,
LOUIS T. SNOW.

DEPARTMENT OF POPULAR SCIENCE.

Our Tongues.

III.

If you will make Johnny put out his tongue, Madam, you will see that the surface is not smooth, but rough, though, perhaps, only to a velvety degree. If Johnny will not put out his tongue (which is quite possible, even in a well-regulated family), you can observe a similar phenomenon on the surface of the beef-tongue, which you are going to boil for to-morrow's picnic-sandwiches.

This unevenness of the surface naturally connects itself with the great sensitiveness of the tongue as to touch and taste. You will remember that the latter sense is supposed to be located at the back of the tongue. It is a curious fact that in that very locality the prominences upon the surface are peculiar in shape, as we shall soon see.

The microscope shows us three forms of surface-projections on the tongue. The first, occurring principally on the upper side of the point of the tongue, are rounded knobs; the second, distributed over the whole member, are brushes; the third, occurring at the back of the top only, are flattened knobs, each surrounded by a circular ridge, from which it is separated by a ditch. The learned names for these prominences are the *fungiform*, *filiform*, and *circumvallate papillae*. Though outwardly so different, they are alike in several respects. The outside, in all cases, is the *epithelium*, a cover consisting of numerous cells, the outer layers of which are dried and flattened into small scales. These are perpetually worn off by the use of the tongue, and removed in the saliva, which they render turbid.

The tongue is thus perpetually wearing out, and its outer layers are perpetually removed. If it were not so, the delicate impacts of touch, and, still more, the subtle agencies of taste, could not affect its nerves as they do.

The under-side of the *epithelium* is irregular, but does not correspond with the irregularities of the outside. It is full of depressions, which make a sort of corrugated roof to the dome of the *papilla*. Under this roof, and filling the dome, is the mucous membrane, through which pass the nerves, to terminate close under the *epithelium*.

It may be shrewdly guessed that the *circumvallate papillae*, which occur, to the number of ten or twelve, disposed in the form of the letter V on the back of the tongue, (you can see them if Johnny will let you,) are specially adapted to the nerves of taste, while the others pertain to touch. Perhaps the little ditches around these *circumvallates* serve to hold the liquid particles of substance tasted, when it has been dissolved in the saliva. Unfortunately, we have never been able to find in these organs any special apparatus for transforming the impulse of such agencies into nerve-force.

Nor do we get much light on the subject when we examine the qualities of sapid (that is, tastable) substances. We know most of them physically and chemically; but we cannot tell what makes them sapid. It is true that we speak popularly of acid and alkaline tastes; but the latter at least, is scarcely a taste at all; and the former belongs to many substances which do not chemically play the part of acids, while many which do play that part, are without such a taste.

If we take sugar as a specimen of sweet substances, we know its constituents to be carbon, hydrogen and oxygen. When dissolved upon the tongue, its influence penetrates in some way to the nerves of taste, producing the current. But we may bring sugar into contact with an exposed nerve, and no current is produced. It is not an irritant like electricity. Again, if sugar is sweet, why should not starch be so likewise? It is much nearer to sugar, chemically, than is the acetate of lead, popularly called the sugar of lead. Yet starch is tasteless, and this metallic compound is sugary in taste.

Solubility, though requisite to sapidity, does not constitute that quality. Pure water is insipid, and so are many highly soluble substances. Nor does the intensity of taste correspond with the degree of solubility, even among sapid substances. Some solutions must be very concentrated; others may be very dilute, in order to give the sensation of taste. Sugar is, in this respect, remarkably low down in the scale. Less than one part of sugar to ninety-nine of water can no longer be perceived. Salt will bear greater dilution; quinine (as you recollect, Madam,) contrives to retain much bitterness in little compass; and sulphuric acid goes farthest of all, one drop of it, in 10,000 drops of water, being still perceptibly sour.

Of the same substance, however, the more concentrated the solution, the more intense the taste. The strength of the sensation is dependent also upon the extent of the surface of taste affected, and the duration of the contact. Here, Johnny, would you rather take a drop of this nasty medicine, or a table-spoonful? And if, to earn a "Jackson ball," you consented to a table-spoonful of the medicine, would you keep it in your mouth, or gulp it down as quick as you could? And then, the saccharine "Jackson-ball" being received, would you crunch and swallow it in a hurry, or suck it slowly, and make it last?

Johnny's replies to these queries, Madam, are prompt, truthful, and thoroughly in accordance with the results of science. But it is needless cruelty—a sort of moral vivisection—to torture him first with the mention of medicine, and tantalize him afterwards with a delusive vision of candy. Draw near without fearful forebodings, intelligent youth! Behold, the friend of the family bestows upon thee the candy without the medicine!

R. W. R.

The Use of Soluble Glass for Rendering Wood Fire-Proof.

The fearful conflagration at Chicago has been the theme on which numerous homilies have been read, and from which many valuable lessons have been deduced. We might comprehend the main conclusions drawn by all the sages who have commented upon the subject in a few words, and say, that if people live in combustible houses they are likely to be burnt out; and that to build a fire-proof building in the midst of lumber yards and wooden houses, which need only a spark to set them in a blaze, is next to impossible.

We can scarcely expect that the building of wooden houses will hereafter in all cases be forbidden by law, and no fire-proof material has as yet been discovered which can take the place of the wood which now enters into the construction of both brick and tone houses. Iron beams and columns have proved entirely inadequate to withstand an intense heat. They are, under such circumstances, but little, if at all, better than wooden ones. They twist and curl up to such an extent that, in Chicago, buildings, it is said, fell down owing to the heat from neighboring fires. We can, however, with but little trouble and expense, render wood almost as passive with regard to fire as brick or stone; and we think that this precaution should be insisted upon by municipal authorities.

The process to which we allude, and on which there exists no patent, so that any one who likes can try it, is briefly as follows: the dried lumber is soaked for a short time in a solution of soluble glass, a silicate of soda or potash, and then immersed in a bath of lime water. In this way the silicate of soda is decomposed and a silicate of lime formed in the pores of the wood.

This substance occurs in nature as a mineral known as Wollastonite, and is both fire-proof and insoluble in water, so that wood once treated in this way will never change its qualities. Soluble glass is largely manufactured in this country, and used for a variety of purposes. An old and well-known chemical house in this city announces in our advertising columns that they are ready to supply his material in large quantities, and will doubtless furnish reliable information regarding the details of the best method of application.

Comparisons of Explosions.

A series of experiments is now making, by Gen. Abbott, of the U. S. Engineers, at Willett's Point, near this city, the results of which, when published, will possess great value, not only for military, but also for civil and mining engineers. They constitute the first attempt to compare with scientific accuracy the power developed in explosion by all the different compounds, — gunpowders, nitro-glycerine, dynamite, gun-cotton, dualin, etc.—now before the public. All comparative tests heretofore made have been vague and inaccurate; but these of Gen. Abbott are planned and executed with an ingenuity and conscientious exactness which promise conclusive results.

As these experiments refer primarily to the use of explosives in submarine torpedoes, the explosions are made under water. The torpedo is encircled at a distance of about eighteen inches, with a heavy iron ring, which carries six equidistant pressure pistons, securely fastened to it on radical lines. These consist essentially of a strong iron chamber, into which a plug or piston is driven by the pressure following the explosion, so as to flatten a small cylinder of lead, which alone offers resistance to the movement. The degree of compression experienced by the leaden cylinder is measured with a very delicate apparatus, and gives a basis for direct and immediate comparison between any two compounds, equal weights of which have been exploded under precisely similar conditions, or between any two explosions of the same compound, under differing conditions.

Moreover, these data of compression may be converted into foot-pounds by means of numerous careful experiments made upon similar cylinders of lead; and a patient repetition of all the experiments will give ample means for eliminating the probable errors of manipulation or observation.

Gen. Abbott's results, together with those obtained on a large scale of practice by Gen. Newton at Hellgate, will be welcomed by the whole profession, which has already learned to trust and value the work of the corps of engineers.

New Publications.

Introductory Course of Natural Philosophy for the Use of Schools and Academies, edited from Ganot's Popular Physics, by William G. Peck, LL.D., *Professor of Mathematics and Astronomy in Columbia College, and of Mechanics in the School of Mines.* A. S. Barnes and Company. New York and Chicago. 1871.

In the new edition of this book, which has just appeared, many important corrections and additions have been made. Such changes are frequently necessary in books on the natural sciences; but the new discoveries which are being made, year by year, in the domain of physics, render these changes at short intervals imperative. A text-book of physics soon gets out of date unless revised, and we always welcome a corrected edition of a book of this kind, but particularly so when the former editions have been the means of disseminating a great deal of useful information, and when the revision is made by a man so thoroughly posted regarding the latest discoveries in physical science as Professor Peck. The chapter on Optics has been carefully revised in the present edition of Ganot, and a clear and able article on spectrum analysis introduced, thus modernizing the book in this respect, and bringing it up to the standard required by the most recent scientific developments. At the same time the form of the old book has been so well preserved, that an old acquaintance of the former edition would recognize almost every page of the new one, notwithstanding the corrections and improvements, to which we have already alluded. A valuable chapter on the application of physical principles to machines has also been added, and several old cuts, which assisted but little in the elucidation of principles, have been omitted, to make place for more important matter.

The Engineering and Mining Journal.

ROSSITER W. RAYMOND, Ph. D.,
WILLARD P. WARD, M. E.,
Editors.

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Babbage and Murchison.

The cable brings us news of the almost simultaneous deaths, at almost the same age, of the two great men whose names are placed at the head of this article. Through long and industrious lives, both of them contributed materially to the systemization and progress of science.

Mr. Charles Babbage was for nearly a dozen years professor in the University of Cambridge; and both during that period and before and after it, was engaged in mathematical and physical researches of the highest value. He is best known in mathematical mechanics by his invention of the calculating "difference engine," which computes and records the members of series containing a single variable, such as are much used in astronomical and other tables. In literature, his great work on the "Economy of Manufactures," and the brilliant and suggestive "Ninth Bridgewater Treatise," bear witness to his genius. Some of his geological speculations, particularly with reference to the rising and sinking of the earth's surface (as, for instance, his papers on the temple at Pozzuoli) have been highly esteemed by scientific men, and indicate great powers of logical deduction.

Sir Roderick Murchison began his career as a soldier, and participated in the Peninsular war. It was not until 1826, when he had attained the age of 34 years, that he appeared publicly as a geologist. A few years after he carried out the great work of defining and tracing the Silurian system of rocks. Murchison's "Siluria" will always remain a classic in geological literature. It is but slight detraction from his fame to say, that his celebrated dictum as to the connection between the silurian rocks and the occurrence of gold, has since been proved an overhasty generalization, and a mistake.

Sir Roderick served four terms as President of the Geological Society, and eleven years as President of the Geographical Society. In 1865 he succeeded Sir Henry De La Beche as Director-General of the Geological Survey of Great Britain. Among his numerous titles of honor or of office, we at least must not forget (what the press generally seems not to remember) that he was President of the Royal School of Mines in London—an institution which possesses among its faculty the distinguished names of Tyndall, Huxley, Percy and Warington Smythe.

The friendship between Murchison and Livingstone, and the faith which the former maintained, when the world despaired, in the safety of the adventurous African traveller, is matter of recent and familiar history.

Pennsylvania Mine Inspection.

We have perused with some interest a public document entitled, "Reports of the Inspectors of Coal-fields of the Anthracite Coal Regions of Pennsylvania, for the year 1870." It contains the reports of five inspectors, and that of the Clerk of the Schuylkill district; and is accompanied with a neatly executed map of the first and second (southern and middle) anthracite coal-fields, by Messrs. Strauch & Cochran, Mining Engineers, of Pottsville.

Many of these mine-inspectors are illiterate men. We should not complain of this, if they did not undertake to deal with subjects beyond their comprehension, and if their work was arranged and edited by some one familiar with elementary mathematics, chemistry and mechanics, and especially with the art of writing grammatically and spelling correctly. But the trouble with all these "practical" men is, that they want to spread themselves in rhotoric and in scientific generalizations.

But, we freely confess that the reports, on the whole, show industry and good intentions on the part of the inspectors. Even Mr. Eltringham, whose literary pigeon-wings last year were somewhat severely criticised by us, has moderated his ambition a great deal, and talks no more about "areoferous substances," when he means gases.

The law passed in the spring of 1870 provided for a clerk, to collect and edit the inspectors' reports. This was exactly the thing needed, to make their work valuable to the profession and the public. Practical miners (even illiterate, if the State cannot find educated men for the purpose) may, perhaps, make all necessary observations and measurements; but they cannot make a book; and hence an expert in reading, writing and arithmetic was provided.

What ingenuity was expended in discovering Mr. P. F. McAndrew, who "does the literary" in this capacity, we cannot estimate. Certainly, we wouldn't undertake to match him with a year to hunt in, and ten thousand dollars to spend upon advertising. At the first sentence of his letter of transmission we are made aware of his genius. He has "the honor to herewith submit the following information of statistics, data, matter and thing which came under my notice, with other information annexed thereto, as may be of general interest in relation to mining, and the safety of persons employed in mines, etc.," and he alludes repeatedly to "information, data, matter and thing," as if he had found a phrase of comprehensive importance, which needed to be "rubbed in."

But we cannot linger on such small, though brilliant, indications of originality in style. There is a rich mine of them on page 9, where the Clerk exhibits his knowledge of science. Here we are told that Fahrenheit's thermometer indicates the difference between the outside and inside temperatures, "which differences are in favor or against natural ventilation, as heat expands the air and renders it buoyant; this circumstance favors natural ventilation; and if explosive gas (carburetted hydrogen) is generated in a mine where the temperature is higher than outside, with a proper proportion of fresh air diluted with it, then its condition is absolutely dangerous." But "a sudden fall in this instrument (the aneroid barometer) inside, and a corresponding rise in the thermometer, indicates the air explosive and the presence of fire-damp. *And a rise in this instrument will determine the presence of black-damp (or carbonic acid gas).*" In choke-damp, "*the lamp will burn an instant, then explode, and death is instantaneous!*"

On page 11 the same startling announcement is made, that choke-damp "will return to its original quality, and explode with equal violence." Mr. M'Andrew should have spared us this. He is paid to exhibit, not his ignorance of chemistry and mining, but his ignorance of grammar, syntax and literature; and he does the latter so completely that he needn't have attempted the former at all.

A large part of his general information has been taken from Daddow & Bannan's "*Coal, Iron and Oil*," published some six years ago. But the manner in which he has butchered it, in extracting and condensing from it, is not atoned for by the stunning advertisement of its merits which he injects on page 37. We have heard skeptical talk as to the value, particularly in a scientific way, of "*Coal, Iron and Oil.*" But Daddow & Bannan *garbled* is worse than *Sartor Resartus*. How does the tailor like this patch, for instance, which our dashing apprentice has inserted in the seat of his most useful garment:

"Within a very recent period coal has been discovered in the south escarpment of the Rocky mountains, which appears to establish the belief that the deposit is *inexhaustible, but cannot truthfully say to what extent, though the area appears to be very extensive and the quantity very good.*"

On page 53 appears a sentence almost equal to the famous "elbows of the Mincio." It is the result of cutting out a paragraph from some book or other, without taking pains to study carefully where one sentence ended and another began. This important place is denoted (by all other authors except M'Andrew) with a period; and M'Andrew could have found it by looking long enough.

On page 83 there is a fine description of the "theorical convictions" of geologists, as "often practically proven to be hypothetical, *much less but* strange and paradoxical." The concluding paragraph on the same page is magnificent, but too long and too like the whole document to be here quoted.

On page 97, we are told that "mine-water contains one-thirtieth of its volume of gaseous element and spring-water one-fourteenth, for the use of mine managers and miners in mines that generate gas."

On page 102, that "gas sometimes explodes, when in small quantities, in the safety-lamp; *and if this locality be then filled with tobacco-smoke, naked lamps may be safely introduced; but if the gas should be above the explosive mixture, the gas will extinguish the tobacco in the pipes.*" This is one of the few grammatical passages that occur in Mr. M'Andrew's production. When this ingenious person tries to say anything sensible, his exuberant style renders it unintelligible; when, on the other hand, he happens to get a subject and predicate properly harnessed, there is nothing but nonsense for them to haul. The burden of managing an idea and a sentence at the same time is too much for him. The reader has a perpetual choice between truth disguised beyond recognition in jargon, and idiocy quite clearly stated.

This wondrous incarnation of Dogberry, Bunsby, and Mrs. Malaprop is much admired by his colleagues, the inspectors. Mr. Frank Schmeltzer, of the first district, says that "through the courtesy of Mr. M'Andrew," all of them were relieved from most of the labor of writing their reports. This explains a similarity of style which pervades the documents in question. Thus Mr. Schmeltzer, through his friend, M'Andrew, talks of his thorough acquaintance with

the mines and operators as lessening "the *temerity* which might otherwise attend a stranger." Mr. Ettringham puffs M'Andrew likewise, in a paragraph which unmistakably betrays M'A's own eloquent style. Mr. Edmunds signs all his lucubrations "per P. F. M'Andrew, clerk," and Messrs. Williams and Evans, greatly to their credit, do not mention him.

Wholly inexcusable on the plea of ignorance are the naked advertising puffs of a patent safety fuse, on page 227, and of a patent self-lubricating car-wheel, appended to the report. It would be perfectly proper for Mr. M'Andrew to describe new inventions, (providing he were able) and if he thought well of them, to say so. But a puff is a puff, and unmistakable. In view of the exhibition made in this volume, however, of the author's capacity, his praise is worth nothing; and if the proprietors of these patents paid him anything to insert their advertisements "next to reading matter," they have wasted their money.

How happens it, let us here ask, that the *American Exchange and Review*, of Philadelphia, in its Department of Mining and Metallurgy, edited by Prof. Charles P. Williams, an accomplished scientist, extracts three pages of rubbish from this book, copying even the patent errors, as where Reaumur is three times alluded to as Beaumur, confounding the thermometer-man with Beaumé, the hydrometer man? If the government of Pennsylvania allows such stuff to be printed, the press ought to be more careful; and Prof. Williams owes his employers and the public an apology. Let him read what he has quoted from this report, and he will wish he had used his eyes before his scissors.

Is there nobody in Pennsylvania, from the Governor down, who can insist that the State shall not be disgraced by the official publication of such illiterate, incoherent trash? We are ready, if need be, for the sake of the reputation of American professional literature, to delegate from our printing-office the assistant devil, to read and correct the future reports of the M'Andrew of Pennsylvania. The State would have saved money by employing that smart boy at five dollars per week; to prepare for publication the work before us. He would have gone through it in three days, striking out what was stale, absurd, untrue, or unintelligible; and the remainder could have been circulated as a single page tract.

MINING SUMMARY.

California.

The San Francisco *Commercial Herald and Market Review* of Oct. 13, contains the following interesting Mining Review:

PROPITIOUS STATE OF THE MINING INTEREST.

In recurring to the subject of mining, we have felt constrained with the advent of each succeeding quarter for the past two years, to remark upon the steadily improved condition of this interest throughout all parts of our Pacific States and Territories. . . . . During the quarter just closed, the work of regeneration and progress has been especially active; the material developments made and the advancement achieved having been quite unexampled in the history of mining on this coast, while much of the prudence and precaution observed in the application of labor and capital to other industries has been practiced also in the conduct of this. . . . . The past year has been one of almost uniform success, particularly in vein mining, where the obstacles to be overcome were most formidable and where our people had most need to learn. It is worthy of notice, that with all this success and progress, there has been no feverish uneasiness or special excitement—nothing like an old-fashioned stampede having occurred since the White Plain hegira. Neither has the spirit of speculation and reckless adventure been so rife of late as in years gone by; nearly all the large transactions consummated having rested on a sound basis, while the great enterprises set on foot would appear, with little exception, to have been well devised and directed to the accomplishment of useful and meritorious ends. In the line of

RECENT DISCOVERIES,

the most noteworthy occurrences consist in the finding of numerous masterly and highly fertile silver-bearing lodes in central Utah and eastern Nevada, with many also of considerable promise in other portions of our metalliferous territory. In the month of August, several argentiferous lodes, giving excellent indications, were found in the neighborhood of Schell Creek, a locality on the old overland stage route, in the eastern part of Nevada. The mines here are scattered over an area of fifteen or twenty square miles. The deposits lie in a limestone formation, and carry a mixture of chloride and sulphuretted ores in a matrix of loose-grained quartz. The surface ores respond favorably under assay tests, and a few trial lots have yielded from $100 to $500 per ton by mill process. The ore masses in many of the ledges appear to be extensive, and there is little doubt but the discovery will prove to be one of much moment. A district has been organized, and is being rapidly populated. A town site has also been laid out and a bustling hamlet built up. It is central to the mines and eighty miles distant from Toano supply point on the Central Pacific Railway, there being a good natural wagon road between the two places.

Within the past three months, mineral deposits of great value have been discovered at numerous points in the mountain ranges to the east and south of Salt Lake, much of the ore being of a purer class than had before been met with in that region. In the Silver Cloud Mine, Camp Floyd District, horn silver and the rich sulphide ores of the Comstock Lode, have been met with in large quantities, this promising to become one of the most valuable mines in that section of the country. . . . . A new description of gold-bearing deposits, denominated

SEAM DIGGINGS,

has been brought into notice through the late explorations prosecuted in the service of the California Water Company, a considerable extent of them having been found along the line of their new works on the divide between the South and Middle Forks of the American River, in El Dorado County. The formation, here covering a large portion of two entire townships traversed by the company's canal, consists of a soft, easily disintegrated slate, permeated by innumerable small seams of quartz. Many of these seams are rich in free gold, and having become thoroughly decomposed through chemical and elemental action, the metal has been liberated from its matrix, and they, together with the inclosing slates, can now be readily torn down and washed away by the hydraulic process. Some of these slates have already been successfully worked in this manner, the only hinderance to their extensive development having been the want of water. With the quantity that the California Company's ditch will be able to supply, they will hereafter be worked on an extensive scale, and no doubt with large profit; and as similar deposits are known to exist in other portions of the State, and so many new water projects are now under way, there is little question but they will add materially to the future products of our California placers. Apart from these discoveries, the extent of the

ORE DEVELOPMENTS,

made during the past three months, in our mines of both early and recent location, has surpassed anything heretofore met with in all our mining experience. First came, early in the summer, the finding of an immense body of rich ore at a great depth in the Crown Point ground, on the Comstock Lode, causing the stock of that company to advance almost without precedent in the course of a few months. About the same period, considerable improvement was reported in other claims on the Comstock, in the vicinity of the Crown Point, followed shortly after by encouraging accounts from White Pine, the Eureka and other districts in Nevada; from various localities in Utah, and finally by the announcement of remarkable discoveries in the Raymond & Ely mine, situated in eastern Nevada. Not only have the ore masses recently brought to light been of great magnitude, but much of the mineral has proved exceedingly rich in the precious metals, that found in the Crown Point and adjacent claims being the richest ever opened up on the Comstock belt, while the Raymond & Ely, and many of the Utah ores, have ranged from one to three hundred dollars per ton by working process.

In addition to these more notable strikes, we have many of minor import to record, a very marked improvement having taken place in nearly every section of the country and class of mines during the past summer. Not from our California gold fields alone, but from all parts of the Pacific slope of the continent, we hear of extraordinary finds and rich developments, both in our vein and and placer mines; and but for the unprecedented drought that has now been prevailing for nearly two years, the present season would have shown an enormous product of the precious metals. As it is, the yield will exceed that of last year, during which the effects of the drought were not so much felt. Owing to the scarcity of water, many ore-crushing mills have not been able to run full time the past summer, in consequence of which large accumulations of mineral have been going on at many of the mines. Immense quantities of auriferous earth have also been extracted from our California gravel deposits, much of which awaits the advent of the winter rains for washing. Many of the dumps in the higher regions, owing to the depth of the snow and the cold winter, will not be washed up till next spring. Taken altogether, this accumulated material insures for the incoming year a great and profitable harvest of bullion, a portion of which may justly be passed to the credit of this.

OPERATIONS IN OUR DRIFT DIGGINGS.

While the yield of our hydraulic, and, in some cases, also of our vein mines, has been thus diminished through want of water, the product of the drift diggings, in which a comparatively small amount of water suffices for washing, has suffered less curtailment. Many of these claims have, in fact, been worked throughout the summer, giving a larger return of gold dust than usual. In Sierra county, this branch of mining has been especially prosperous. About Downieville, Monte Christo, Forest City, and other camps in that vicinity, the miners have been doing remarkably well. Throughout all parts of the famous Slate Creek Basin, the past has been a prosperous season. Many tunnels that had been in course of excavation for years, have reached pay gravel and begun to yield liberally; while others, that had already reached the channel, have been found to increase their returns the farther they are advanced. The North American Company, whose tunnel is now in over two thousand feet, more than half of it in rich gravel, are obtaining better pay at the inner extremity of their works than at any other point, showing a steady improvement in the channel as they follow it up. This ground is owned by a company of laboring men, who have taken from it nearly one hundred thousand dollars. . . . . On the divide between the North and Middle Forks of the American River, the site of many camps once renowned for their outpourings of marvellous wealth, but where for many years little has been done, operations have lately been set on foot that are likely to re-establish the importance of these diggings, and resurrect mining into a new life. Men of influence, energy, and ample means, are moving in the matter of buying up and bonding many of these old claims in the neighborhood of Forest Hill, Damascus, Bath, Michigan Bluffs, and Last Chance, with a view to consolidating and working them on an extensive scale, through the application of both home and foreign capital. A number of claims on this divide have already been opened up, and are yielding returns that would pay handsome dividends on a large investment; such as the Weske, the Morning Star, Yule, and others in the vicinity of Last Chance. The Yule ground has been paying regular monthly and semi-monthly dividends for a long time, at a rate that fully establishes its capacity for large and permanent production. The San Francisco claim, located on the same series of channels, and owned by parties in this city, has just been opened by a tunnel run a distance of 750 feet, striking a rich body of gravel that promises large results. As this tunnel will afford drainage to the entire range above, it will command much valuable ground in that direction.

HYDRAULIC WASHINGS.

While, as before observed, production from this source has been much restricted, in consequence of the long continued drought, many claims of this class have yielded fair out-turns during the past summer. Among the more noted that have yielded bountifully, or been placed in a position to insure immediate large production, are a number about Last Chance; many in the vicinity of Gold Run and Dutch Flat; the extensive and valuable claims of Little York Company, Nevada county, where an immense quantity of poorer top-dirt has been washed off, and a large area of rich gravel has been exposed for future operations. The Blue Point Gravel Company, in Yuba county, cleaned up $71,000 for the month of August, their other monthly runs throughout the season having averaged nearly as much. The Summit Company washed out from forty to sixty pounds of gold dust weekly, during the entire season. The Galena Company at Morristown, Sierra county, after being idle for eleven years, lately started up, and have since been doing remarkably well; several other companies in the same neighborhood having met with a like experience after a similar suspension. Most of the companies about San Juan—a great hydraulic mining centre—have been well prospered the past summer. The owners of the American claim, from which over $2,000,000 have been extracted, are now running a bed-rock tunnel a distance of over two miles, to

secure deeper drainage for their ground, which is, as yet, but partially exhausted. The celebrated North Bloomfield Company, for the purpose of increasing their water resources, are about to add the enormous height of 135 feet to their present claim, whereby the supply of water will be more than doubled. The Birdseye Creek and the Sweetland Creek claims, both situate in Nevada county, and sold not long since to English parties, have been yielding moderately well all summer, notwithstanding the drought, whereby their productive capacities have been sadly crippled. Under their present excellent management, their prolific character will be better shown after the advent of our fall rains; and there is little doubt but their future production will more than warrant the considerable advance in the value of the stock of these companies that has taken place since their organization. The Lagrange Ditch Company, composed mainly of wealthy San Franciscans, are constructing, at heavy cost, a large canal for conducting water from the Tuolumne River to an extensive gravel deposit near the town, which is to be worked by the hydraulic method—it having lately become apparent that these beds of auriferous material is are by no means confined to that portion of the State where only the heaviest operations have as yet been carried on. From Nevada and adjacent counties, their discovery has gradually spread southward as far as Mariposa, and north into Trinity, Siskiyou, and Klamath counties, in all of which washing is being conducted by this process, or preparation is being made for its early inauguration.

When we consider their vast extent, and how small a percentage of gold will warrant their being washed by the modes and appliances now in use, we perceive that we have in these gravel deposits material that cannot be exhausted in centuries. From a calculation based on careful examination, made by W. H. Pettee, of the State Geological Survey, it appears that the great mass of top-gravel—the only portion yet piped off—in the Gold Run District has averaged no more than five cents to the cubic yard of earth; and yet the 43,000,000 yards disposed of by hydraulicing have been worked with good profit, the gross yield having amounted to about $2,100,000. About Little York, Birdseye Creek, and over on the Yubas, the average product of the entire mass of earth washed has been from twenty to twenty-five cents, as will be the result in Gold Run, probably, when the bottom gravel comes to be worked. But little of the latter has yet been disposed of in the several claims of the Little York Company, which, it is expected, will give splendid returns, when it comes to be attacked the coming winter with plenty of water.

MINING IN AND ALONG THE RIVERS AND OTHER SHALLOW PLACERS.

Apart from hydraulic and drift operations, the amount of placer mining now carried on in this State is comparatively small. In some instances the river beds and bars, and the gulches, continue to afford profitable workings; the greater portion of this class of diggings being now in the hands of Asiatics. In several of the northern counties, as well as in Oregon, Idaho, and Montana, many whites still operate in and along the streams, which have not been so depleted in their wealth as in other portions of our California gold fields. The low stage of water this season has favored wing-dam and river-bed work, mostly confined to this State, while elsewhere, the water dearth not having been so stringent, the superficial placers have come up more nearly to their ordinary yield.

The discovery of a considerable scope of virgin placers on Bull, a tributary of Butte Creek, was announced during this summer. Some new findings were also reported in other and more distant localities; but they do not appear to have been of any great magnitude. An expedition of two hundred well-armed men, who proceeded, in the latter part of the summer, under Governor Safford, to explore the Pinel Mountains, southern Arizona, returned, after a month's absence, without finding the rich placers they went in search of, and that they had been assured, by a man named Miner, existed in that range.

VEIN, OR ORE MINING.

The success attending this branch of mining, of late, has been, as before observed, very remarkable. Nor has this success been restricted to our own territory, many of the mines of Lower California, and certain districts in Mexico having meantime shown great improvement. The Triunfo and several other lodes, situate in the former, are beginning to yield satisfactory results, while some very extraordinary developments are in progress in the celebrated Batopilas District, State of Chihuahua, from which large and regular shipments of bullion are now being made, and there is little doubt that these once famous mines will shortly be able to vindicate their claim to rank among the richest, if not the most largely productive, in the world. The veins here, though not generally of very great size, carry, for the most part, extremely high-grade ore, and abound in enormous quantities of native silver. They were worked many years ago by the Spaniards, who, having followed them down as far as was practicable by their feeble modes of exploitation, were forced to abandon them. Recently operations have been resumed upon them, and, under modern management, they are likely to become very remunerative. The Sierra de las Animas, according to an able report on the same made by R. H. Stretch, is literally striated with rich veins. Into this mountain a grand exploitation tunnel is now being run by H. A. Stearns, an energetic American, now residing and operating there, being largely interested in mining properties. Quartz mining in our own State is steadily expanding and working its way on to a better footing. New mills are being built, the old ones overhauled, and the idle ones started up. So, too, suspended work is being resumed on many lodes, and operations on others pushed to a larger expansion. Mines that had suffered decline are returning to their pristine state, and even outdoing their former record. The famous Allison Ranch Lode, after a clouded history for a series of years, is again sending up much highgrade ore. The Amador, in which a destructive fire brought operations to a halt nearly a year ago, is once more going on with unimpaired energies. The Confidence continues its almost unexampled rate of production; and the Soulsby, near by—really one of the best quartz properties in the State—is, after years of neglect, likely soon to be restored to usefulness and placed on the list of our most largely productive and profitable mines. The prevailing drought, while it has compelled a number of our quartz mills to shut down for want of water, has also, by its check upon placer operations, caused many miners in this branch of the business to leave it, and engage in prospecting for quartz, leading to an unusual degree of activity in that department.

The quartz we are considering has been prolific in the inauguration of

NEW AND IMPORTANT ENTERPRISES,

designed to economize and utilize our water resources, and thereby extend and give greater efficiency to mining and agricultural operations. First on the list of beneficent schemes stands the California Water Company, organized in San Francisco with a capital stock of $10,000,000, for the purpose of mining, supplying water for mining, irrigating, manufacturing, and for domestic use in the cities of Sacramento, Vallejo, Oakland, San José, San Francisco, and other places; also, for the purchase and sale of agricultural, timber, and mining lands. For this object the company has located, by right of discovery, obtained by purchase and grant, and taken possession of twenty-four lakes, varying in extent from one hundred to two thousand acres each, situated in the Sierra Nevada Mountains, in El Dorado county, at an elevation of from three to five thousand feet above the sea. These lakes are fed by streams from mountain peaks and gorges of perpetual snow, and are capable of furnishing a constant stream of 60,000 inches of water of the purest kind. From these lakes run the Big and Little Rubicon rivers and other streams tributary to the Middle Fork of the American River, which have also been claimed and taken possession of, according to law. These are all very favorably situated in the high Sierras, and constitute the most convenient, perfect, and valuable water right in California. The facilities for constructing dams at the outlets of these lakes and on the streams, are great, admitting of these natural reservoirs being increased to an unlimited extent, while the reservoirs that are to be constructed in connection with the work, and which are to be filled with the waste water of winter, will alone supply 10,000 inches for an entire year.

The company has also obtained possession of several thousand acres of valuable mining ground in the region to be supplied with water, and of a large area of timber and agricultural lands in the same section, being the choice selections of near two hundred thousand acres of Government and railroad lands within the limits of the field of operations; and all of which can be purchased at from $1 to $2 50 per acre. The country is heavily timbered with pine, spruce, cedar, oak, etc. The soil is generally fertile, and is well adapted to cultivation in the various products suited to the different stages of elevation, the lower portion embracing some of the best fruit- and wine-producing country in the State.

The region to be supplied with water, apart from the several cities named, comprises an area of from five to twenty miles in width and fifty in length, containing numerous towns and mining camps, creating a demand for from ten to twenty inches of water, at a price of ten cents per inch for ten hours' use, independent of the large amount needed by the company in washing its own mines. . . . . The distance from the lakes in the Sierra Nevada to Sacramento is about seventy-five miles, and the total ditch and length of pipe to conduct the water to the various mining camps and the city would cost probably $250,000.

THE STATE GEOLOGICAL SURVEY

Has since been well maintained by Prof. Whitney and his corps, a portion of whom have spent much of the summer in continuing their examination of our deep-lying placers, as exhibited in the vast banks of diluvial drift and the channels of the pliocene rivers. In the month of August, Amos Bowman made a thorough reconnoissance across Sierra County, following the "Blue Leads" as developed on either side of the famous Slate Creek Basin, and thence along the Middle Yuba divide from Snow Point to French Corral. Mr. Goodyear has been busy in El Dorado County, thence working south. The examinations of Mr. Bowman and Mr. Pettee, while they fully establish, not only the existence, but the exact course of many of these dead rivers, which they traced to their sources in the summit craters in the Sierra, tend, at the same time, to render the existence of a grand channel crossing the present drainage courses of the country at nearly right angles, somewhat problematical. The investigations made by these gentlemen, while they will throw much light upon the origin and structure of these strange formations, will also be of great service to the practical miner, by indicating more exactly the position of the auriferous deposits they contain, and the best methods to be adopted in their exploitation. Mr. Bowman is engaged in making, and will soon have finished, an elaborate set of maps and diagrams, illustrating the geology of these ancient streams and other points of interest connected with the surveys; a work that will alone be worth all the money expended by Prof. Whitney and his assistants in the prosecution of their noble but ill-requited labors.....

ADVANTAGE OF, AND NECESSITY FOR, RAILROADS.

From the foregoing, it will be seen that we are making a gratifiing progress in every branch and department of mining. Even in the line of metallurgical treatment and mechanical invention this period has been distinguished above all others, while our ore developments have eclipsed anything in our past history. The discoveries made in Utah and Nevada are remarkable alike for their number and magnitude—a result entirely due to the advantages growing out of railroad communication with those regions. The mines of Utah, and also some of the best in more remote portions of Nevada, were discovered many years ago, but could not be worked with profit, owing to the cost of freighting machinery and other materials to those distant and insolated points. With a grand trunk reaching either way to the sea-board, it will only be necessary now to construct lateral branches leading to the several mineral districts, to give such further impulse to mining in that quarter as will soon double and even quadruple the present rates of production. Already the construction of one of these feeders has been commenced, designed to connect Elko with White Pine. The work is in good hands, and will be pushed ahead rapidly, it having the aid of liberal subsidies voted by the people of the counties it crosses before the present senseless crusade was begun against these beneficent institutions. It is to be hoped that the inhabitants of other counties will follow the wise example set them by the people of Elko and White Pine, and assist, to the extent of their means, in building any railroad that promises first to connect their neighborhood with the Central Pacific.

The surveying and engineering of this extensive project have been done under the supervision of Messrs Fairchild and Angel, men of great skill and experience in their profession. J. H. Crossman, a man of rare energy, has charge of the labor force and construction works; many of our foremost business men and capitalists are financially interested in the enterprise.

The construction of the Von Schmidt system of aqueducts has been already entered upon. That portion, looking to the gathering up of the waters west of the Sierra and carrying them into adjacent mines, will be pushed rapidly forward, while that involving the tunneling of the mountain will, from its great magnitude, be somewhat longer in getting through with preliminary preparations. Both the great irrigating canals designed to divert the waters of the San Joaquin across the vast plain on either side of the river, have been hastened on during the summer with an energy and success that insure for them an early completion. The ditch of the La Grange Company, several important works of

this kind in Butte and adjoining counties, with others of lesser magnitude in different parts of the State, have all been industriously prosecuted and will soon be ready for use. Among enterprises of this class projected or begun, but not yet far advanced, we have that of a set of tunnels and flumes for draining the Shasta Basin; another for opening up Kincaid's Flat, in Tuolumne County; a plan for leading the waters from certain tributaries of the North Fork of the American upon the divide south of that river, and numerous other schemes of lesser moment look to the accomplishment of similar ends.

Idaho.

From the Owyhee *Avalanche* of October 14.

SOUTH MOUNTAIN.

As soon as this new mining district becomes known to the outside world, it must inevitably create one of the greatest mining excitements heard of since the days of '49. A large number of our citizens, many of them old and experienced quartz miners, have visited South Mountain within the past few days, and confess themselves both surprised and astonished at the number, magnitude and richness of the ledges, some of which are 50 feet in width and can be traced for miles. The ore is argentiferous galena and contains all the elements necessary for successful smelting and reduction. Mr. DIMONDI of the firm of McDONALD & Co., assayers, has made some 30 assays, from various ledges, which range from $20 to $475 in silver per ton. Mr. MILLER, Superintendent of the South Chariot, and who is himself a practical assayer, has also made two assays, one of which shows $145, and the other, $152 per ton. Already there have been over 100 locations, and new discoveries are being made every day. Three hundred fortune-hunters are reported on the way thither from Salt Lake. The mines are somewhat less than 25 miles in a southly direction from Silver City. It can be easily walked in a day, and ridden on horseback in half that time. People, who have been in every mining camp on the Pacific coast, declare that South Mountain surpasses them all.

There is a movement on foot, among parties interested, to have a ton or so of the ore smelted at McMAHON'S Foundry. This is wise, as the cost will be but little, and the result more definite and satisfactory than the assay of a few ounces.

From the same paper we clip the following

MINING ITEMS.

Operations on the Ida Elmore mine, at present, consist in running two drifts in the fifth and seventh levels respectively, north of the shaft. The average width of the ledge is about three feet. It is expected soon to commence sinking the shaft for the eighth level. There is an abundant winter supply of fuel and mining timbers laid in at the mine and about 2,000 cords of wood at the Company's mill, for the winter's run. A large amount of castings and other supplies, for both mill and mine, are also on the way from San Francisco. The mill still continues running on tailings which are paying very well.

The Minnesota shaft is now down about 140 feet, well timbered, and adapted for either horse or steam power. A contract has just been let to sink the shaft an additional 100 feet. The ledge is fully two feet wide, and it is thought, will turn out fair milling ore. A building, 30x55 feet, is now being erected over the shaft, where steam hoisting works will be put up between now and spring. Work, for the purpose of opening up the mine, will be regularly prosecuted all winter.

The Mahogany shaft is now down 80 feet for the 4th level. They expect to cut the vein at a depth of 100 feet, but will not stop the shaft. Superintendent MINEAR intends to open the mine well and get it in good shape for working before attempting to mill any ore. The mine has a full supply of wood, lumber, timbers, coal, &c., with sufficient powder, candles, and all other articles necessary for mining, on the way from San Francisco to last till next June.

E. A. THOMPSON has leased a portion of the Idlewild mine to a company of Cornish miners who are taking out good looking ore. Mr. THOMPSON is now at work on the south end of the claim, where he has a shaft down about 38 feet. The vein is 6 inches wide and shows free gold in considerable quantities.

The shaft on the Empire (known as Judge ROBERTSON'S mine) is down 140 feet, at the bottom of which another vein or spur unites with the main ledge which is now fully two feet wide, yielding fine looking silver ore mixed with gold. S. M. FASSETT, Esq., just arrived from Elmira, N. Y., is Superintendent of the mine and will vigorously prosecute work all winter.

MICKEY & Co., are now taking ore from the original Empire, 60 feet from the face of the cut, where the pay streak is from four to six inches in width and is undoubtedly the richest body of ore at present known in this camp. A considerable portion of it is almost pure silver mingled with gold, and can with difficulty be broken on account of its malleability. The boys have got a good thing, and, with proper management, will make a snug fortune for themselves before the expiration of their lease. The Empire is destined to rank first among the best mines of Owyhee.

The lessees of the Woodstock are getting out fine looking ore from that mine and also from the Empire north of Mickey & Co's claim.

Superintendent WALBRIDGE is energetically pushing work in the War Eagle, formerly known as the Skookum. His lieutenant is that able and experienced miner, JACK WILSON. The War Eagle shaft is 160 feet deep, from the bottom of which a drifth has been run on the third level about 85 feet south and 10 feet north. The ore is mostly decomposed and very rich in gold and horn silver, the pay vein being about 18 inches in width. A different kind of mineral from anything hitherto found in the mine was struck in the north drift this week. It bears some resemblance to the rich silver ore taken from the Poorman in its palmiest days and War Eagle stock holders are immensely jubilant thereat.

The lower, or south shaft on the Red Mountain, which is 110 feet deep, is being put in order and the old drifts cleared out, preparatory to immediate working.

The SANDS Bros. have struck the Illinois Central near the south end of their claim. They have a shaft down 12 feet, at the bottom of which the vein is 14 inches wide, and gives flattering prospects of both gold and silver. The boys are persevering in the highest degree and we would be pleased to hear of their meeting with the success that they assuredly deserve.

The Amador is looking well, and, in order to test the ore, ten tons will immediately be worked by Mr. CHEASBRO in the Minear mill. This is the new mine that we mentioned last week, as situated below the Oro Fino grade, north of Cape Horn, and owned by KIRKPATRICK, ZAPP, CATALOW and MINEAR.

A three-foot and a half vein of quartz has just been cut through at the bottom of the new 80 foot level in the South Chariot, but Superintendent MILLER is of the opinion that the main ledge is still further east and is running a cut to find it.

The Oro Fino is yielding large quantities of ore which is said to be paying well.

BROWN & MAGUIRE will soon have another batch of Little Giant ore ready for crushing.

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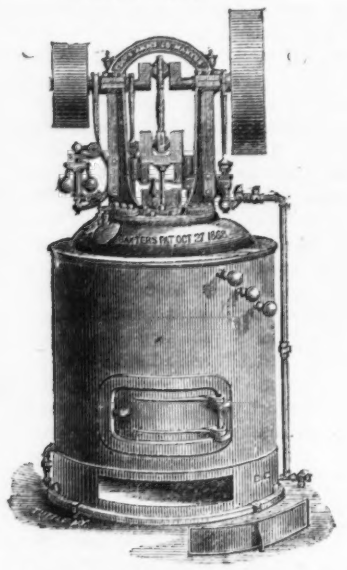

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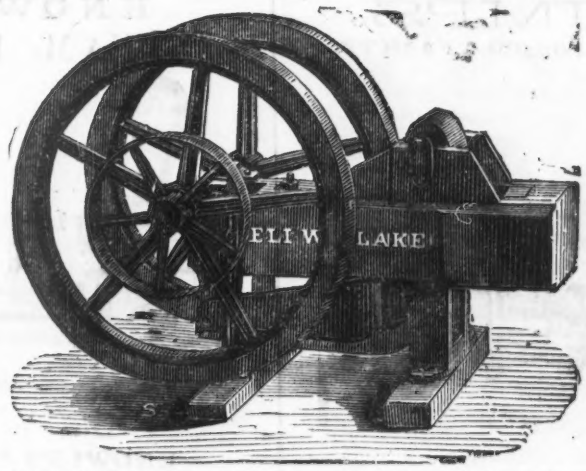

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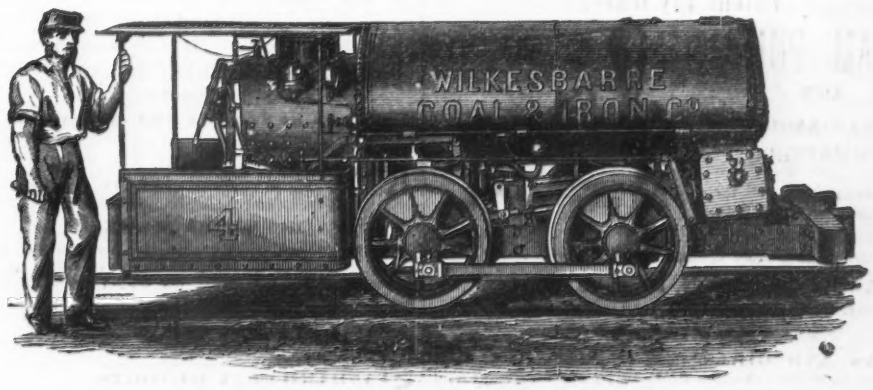

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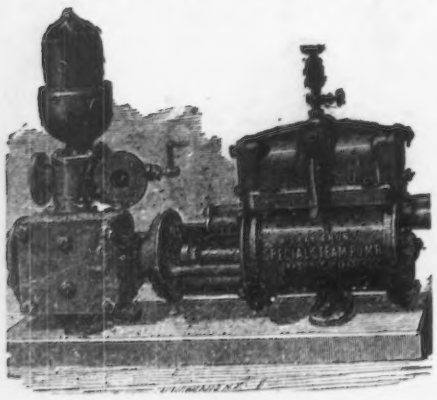

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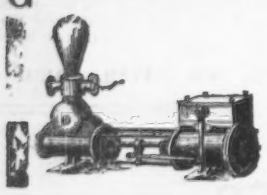

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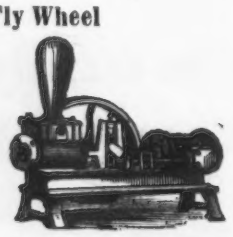

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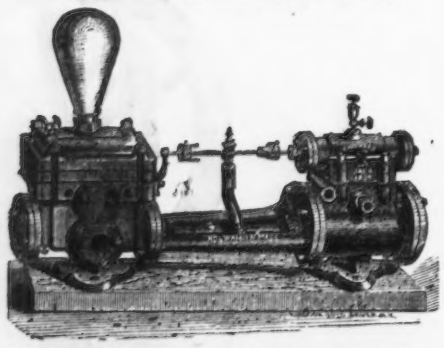

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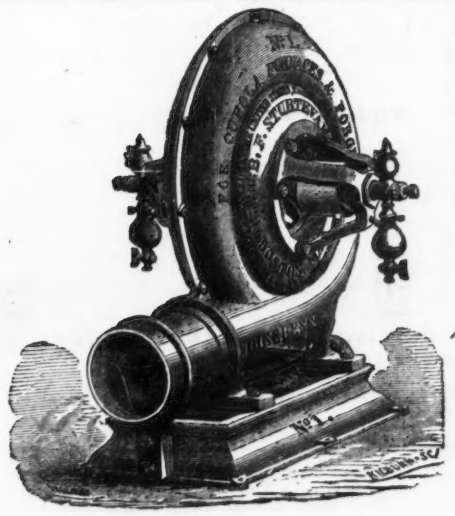

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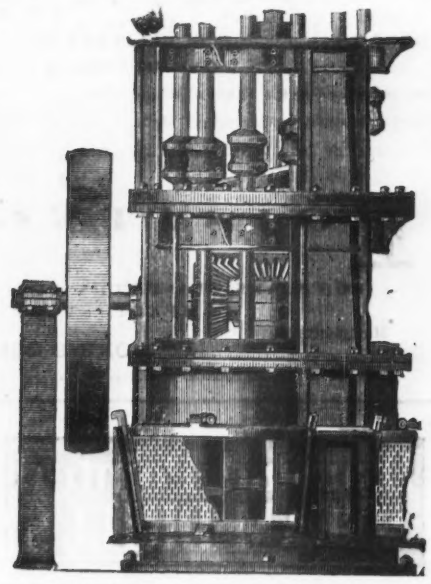

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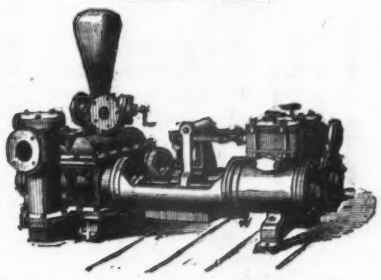

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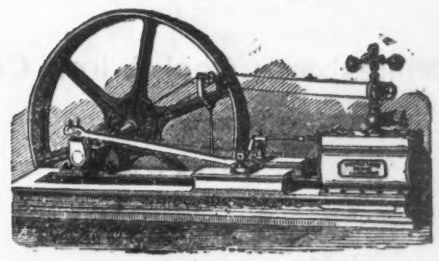

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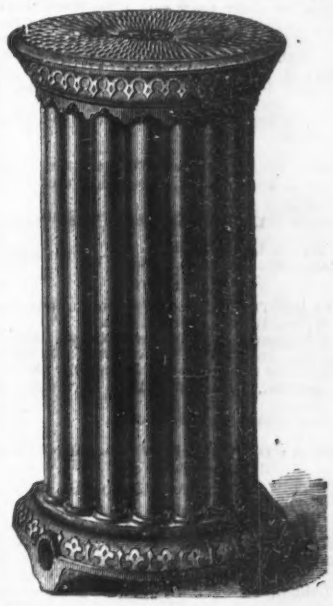

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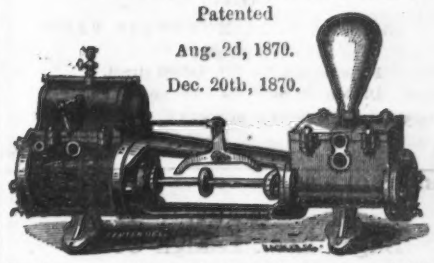

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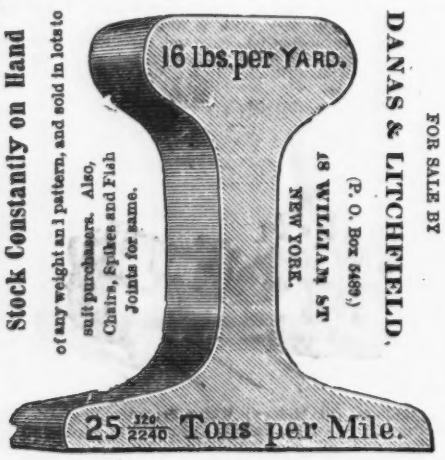
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